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Truck Show Most Wonderful Transportation Exhibit Ever Staged in America

IN a building, which was in itself a wonderful sight, New York's annual motor truck show of early January has gone down into history as the most extraordinary transportation exhibit ever staged in any country. There have been more varied exhibitions of the many types of transportation used over the wide world, but never has there been gathered under one roof such a tremendous display of a single type of transportation such as the thousands who journeyed to the New York show gazed upon. Even to one who has full knowledge of what the motor truck is accomplishing in every section of the United States, the New York show was profoundly impressive. What then must have been its impression upon the thousands of dealers whose knowledge of the industry was, of necessity, more or less circumscribed? Those dealers who, for instance, have not heretofore been really convinced of the magnitude of the business of which they are a part or of the vast importance of the motor truck in today's transportation scheme. To that type of dealer the New York show was the last big selling argument, and they have scattered to the four corners of the United States, thoroughly alive to the tremendous future of the business they are in, and ready to more than ever do their part in putting the motor truck onto every highway and byway, as the one big standard transportation unit on which the American public will come to finally rely.

Location of Building Not Advantageous

No better building could have been chosen for the show than the Eighth Coast Artillery Armory, nor a worse location. Miles from the hotel center of the city, the building was visited only by those who had an actual business interest in being there. While this had its advantages, there is little doubt but that a smaller building in the heart of the city would have been far more advantageous from almost every angle save size. Truck manufacturers who expressed themselves felt that it would have been far better to have paid more for a building downtown, which would have required much less advertising expense, than to have paid the lesser sum for the far off building, and then the resulting larger advertising expense made necessary in getting the public there.

Of the fitness of the building itself there can be no question. Six hundred feet long, three hundred feet wide, one



A View of the West End of the Hall, Showing Part of the Equipment Exhibits

hundred and ten feet to the roof girders —and not a single post to obstruct the view. Certainly a magnificent place in which to display America's greatest transportation system. And the manner of display was such that one could easily visit every separate group and thoroughly inspect each individual unit from every side, an advantage especially worth while in a truck show.

No elaborate decorative scheme could be used in a hall this size save at prohibitive cost, so that decorations were confined to a striped bunting ceiling within the vast dome of the edifice, and small panels which relieved the flat monotony of the armory walls. Even at that, it is said, that over eight tons of bunting were used. And to make it easier for those who attended the exhibit, linoleum was used in covering the concrete floor in the aisles.

Few Radical Changes in Design Noted

That the American motor truck has reached a very definitely standardized state was easily noticeable in looking over the various exhibits. Only one really unusual change was noted in the entire list, and this was merely in the placing of the engine, which was brought nearer the rear axle, under the seat instead of under a hood, forward of the seat. Little that was new was offered, but all along the line a very definite improvement in all the details that make for strength, stamina, efficiency, was in evidence. The American motor truck is no longer the draught horse of careless breed. It is the strong limbed, powerful draught horse that shows in its every line the result of the most careful breeding toward all the elements that go to make up a perfect animal of the type.

The one big outstanding feature of the show was the change from solid to pneumatic tired exhibits. Hardly a manufacturer but that showed from one to two or three trucks in his space equipped with pneumatics. Everywhere the big tires attracted unusual attention, showing that their performance during the year just closed—their first big year—has attracted country wide attention. Dealers who had had little opportunity of observing the big tires in action were greatly interested.

As to the success of the show from a business standpoint, there seemed to be a general impression among the exhibitors that results were fairly satisfactory. Practically all of the manufacturers maintained downtown headquarters, where they met the thousands of dealers who came in from all over the United States, and the contracts signed or renewed were in sufficient volume to be considered worth while. The attendance of dealers from nearby states was very satisfactory, and there were a commendable number in New York from the outlying districts, even the Pacific coast sending in a fair quota.

The exhibit of motor truck equipment was thoroughly interesting, as always, and there was sufficient space so that the manufacturers of this type of accessories could make a really interesting display. Motor truck equipment, like the trucks themselves, has improved wonderfully in the past year or two, and the New York show was concrete evidence of this fact.

The Highway Transport Conferences held in conjunction with the show were far from satisfactory to those who had worked hard to plan them and put them across. The distance of the hall from the center of the city, and consequent small attendance, made the audiences at these conferences ridiculously small. Those who went to the truck show had come so far to see the trucks that they evidently preferred to spend their time going over the show than in sitting in the highway conferences, and therefore a wonderfully inspiring program went almost for naught. Some good will doubtless spring from the germ implanted in the minds of a few at these conferences, but they failed utterly to reach the mass of truck dealers and others who should have been vitally interested in hearing the various addresses, etc.



Exhibit of the U. S. Motor Transport Corps

This exhibit attracted a great deal of attention. A Class B truck, cutaway engine and other sectionalized parts made by the students of Camp Holabird were shown. A large panel and charts illustrated the method by which the army checked up the repair jobs



General View of the New York Motor Truck Show Held at the 8th Coast Artillery Armory

In itself the motor truck show was truly the most representative gathering of highway transportation vehicles that were ever shown under one roof. Although the armory is a splendid edifice in which to hold a show of this kind, unfortunately it is inconveniently situated. Too far away from New York's business center

Three Point Truck Made in One Model Rated at Six Tons

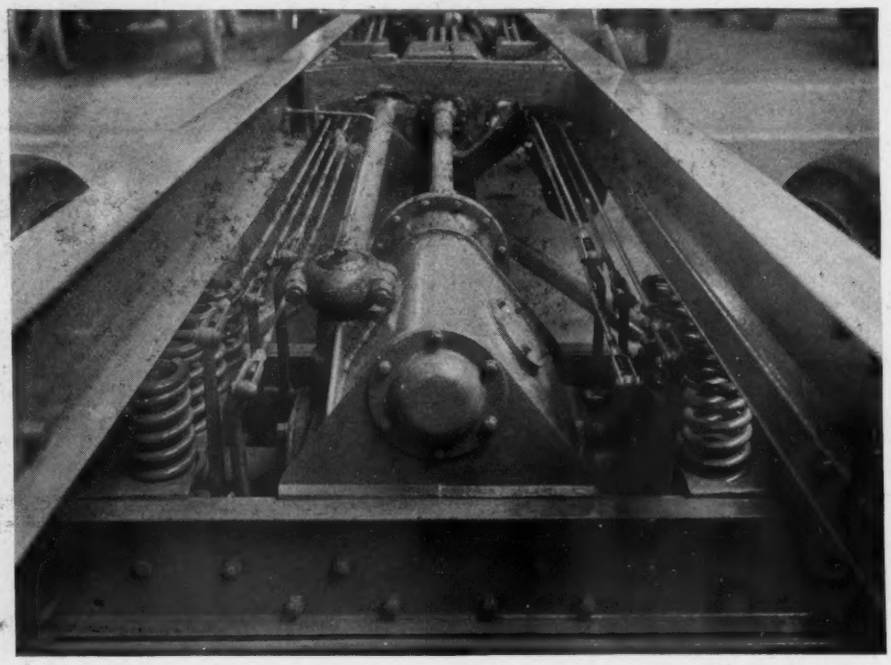
THE value of three point suspension in automotive engineering has long been proven and it is this principle that has been applied with success to the chassis of the Three Point truck, the product of the Three Point Truck Corp., 536 Fifth Ave., New York City. The chassis, which is to be produced in but one model, A-13, is not a product of the war as it was designed five years ago and a number of these trucks have been in service for the past three years. Production, however, was not possible because of war conditions. The Three Point chassis is built by the New York Air Brake Co., Watertown, N. Y.

Variable Load Capacity

The new entrant in the commercial car industry is not only a radical departure from conventional practice in several respects, but with the exception of the power plant, clutch and equipment, such as carburetor, magneto, etc., the chassis is built by the company. What is, perhaps the most distinguishing feature of the chassis is the wide range in load capacity. While its nominal rating is 6 tons at 13 m.p.h., it is said to be eeconomical with all loads above 3 tons, but within the safe limits of the tires. It is stated that the applied power will carry six tons over 20 per cent. grades. The ability to carry varying loads is claimed to be due to correct engineering balance, and because of the proper porportioning of the units subject to stresses.

Use Three-Point Principle

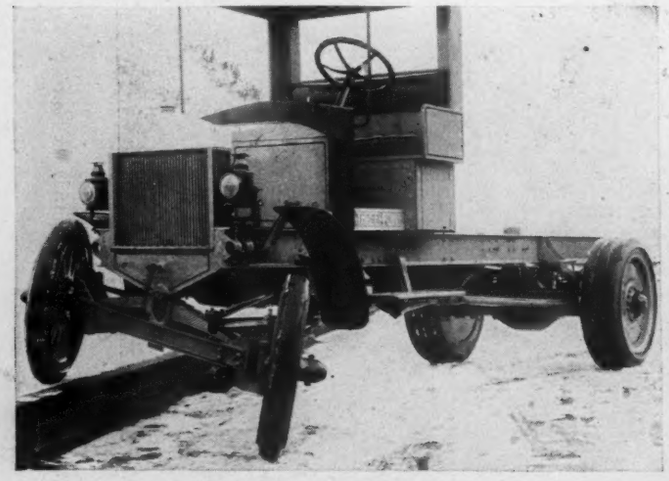
Application has been made of the three point principle both to the front and rear axles. The chassis frame is supported above the front axle, at the center of a single, semi-elliptic transverse leaf spring, and is stayed by the use of a triangular radius rod through a ball joint at the center of a dropped frame cross member. The forward ends of these tubular radius rods are mounted beneath the axle, which differs in that it is a 4-in. channel section instead of the usual I-beam type. The parallel steel channels are separated by yokes with forged steel steering knuckles, and the ball jointed tubular knuckle rod carries oil. The ends of the transverse spring, which rests between channels, are lubricated, and the spring box is pivoted at the center of the cross frame member. There is an oil reservoir in the pivot construction, tubes supplying the lubricant. One of the advantages of the suspension is shown in an accompanying illustration, depicting a wheel on a stringer of a wharf and, as may be noted, the frame cross member is in a horizontal plane.



Looking Towards the Front of the Three-Point Chassis

The rear axle is also a marked departure from conventional design. It consists of 8-in. parallel steel channels separated by worm gear housing or case in center and axle shaft bearing boxes at outer ends. The three point principle is utilized for the drive, it being taken through a three-point tubular thrust rod. This drive rod carries a ball at its apex or forward end which is mounted in a dropped cross frame member so as to obtain a straight drive. The rear ends of rods are pivoted horizontally to the rear axle and the tubes carry oil to the bearing surfaces.

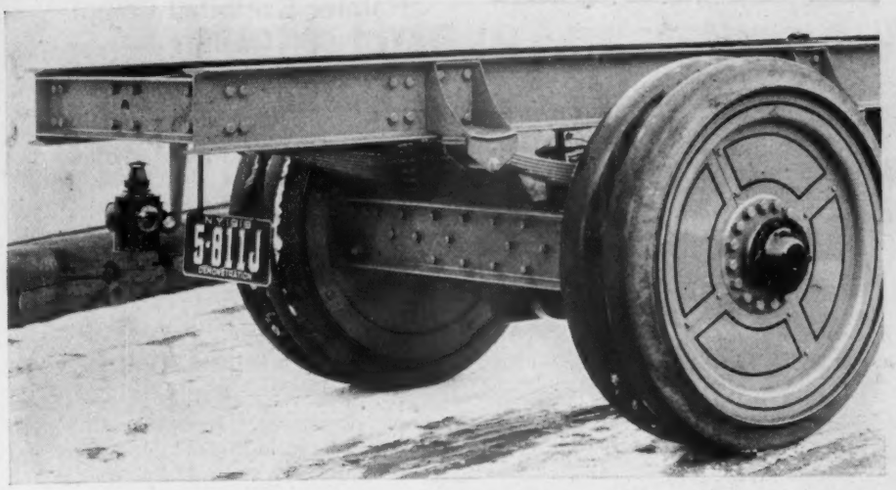
The rear axle is aligned against the twisting effects of the driving and braking torques by means of a torque rod. This is a horizontal tubular rod ball jointed to a frame cross member. The torque rod is parallel to the drive rod, and the



Illustrating How Three-Point Suspension at Front Permits Frame to Remain in Horizontal Plane



One of the Demonstrations Made to Show Rigidity of Frame and Three-Point Suspension



Showing the Rear Axle Construction Having Parallel Steel Channels, a Three-Point Drive and Torque Rod in Parallel

rear axle with worm shaft, springs and brakes, is always parallel to the chassis frame. Statement is made that there is no axle oscillation, worm surging, tire shuffling or brake seizing.

The axles are of solid forged steel, of the semi-floating type and the wheels are keyed to the shafts. The worm is steel and the worm wheel of bronze. A spur gear differential is employed. The bearings are of the adjustable roller type. Lubrication is by reservoir.

The frame is supported at the rear by semi-elliptic springs and there are eight coil auxiliary springs which care for load above a certain point. The springs are of silico-manganese steel, have no shackles, eyes, bushings, rebound clips or grease cups. The frame is supported at three points, one above the center of the front axle, as described, and two points on the rear axle. Emphasis is laid on the elimination of uneven loads on the frame members and the absence of twisting or distortion of the main frame which is unusually rigid.

Special Brake Design

There are two separate enclosed wheel brakes having eight self-centering equalizing lined shoes which contact with steel rims inside the wheel rims. The diameter of the rims is 28 in. and the face is 6 in. This affords ample braking surface under the most exacting service. Equalizing brake rods are parallel to the torque rod, and the pressures are held to be unusually uniform and well balanced. The axle brake shafts are housed in steel tubes packed with grease. The brake slide rods are reservoir oiled and the adjusting mechanism is very accessible.

The engine is a standard make, a four-cylinder unit having a 4¼ in. bore and a stroke of 5½ in. It is of the L head type with removable cylinder head, pressure lubrication, centrifugal water pump, combination exhaust and intake manifold, etc. It is suspended at three points. The carburetor is a plain tube type, fixed air control, hot air intake, and the governor is of the centrifugal type. Ignition is by a true high tension magneto, single, fixed ignition, and a flexible, adjustable coupling is used. The fan is 18 in. in diam., ball bearing, and is driven by a 2-in. endless belt. The radiator is a copper, tubular type, with sections bolted between aluminum and iron tanks. Fittings are copper and brass. The muffler is of pressed steel sectional cup type with a seamless steel pipe from exhaust manifold to muffler.

Chassis Dimensions

Length of frame back of seat	13 ft.
Body lengths	13 to 16 ft.
Wheelbase	15 ft.
Turning radius	26 ft.
Width of frame	36 in.
Height of frame loaded	37½ in.
Width of cab	55¾ in.
Height of cab above frame	65 in.
Width of seat box	49¾ in.
Width over front hubs	77½ in.
Width over rear hubs	80 in.
Width between front wheels	54½ in.
Width between rear wheels	48 in.
Front wheel tread	60 in.
Rear wheel tread	62 in.
Front of wheels to radiator	15 in.
Front axle to back of seat	80 in.
Back of seat to rear axle	100 in.
Rear axle to end of frame	56 in.
Front axle ground clearance	11 in.
Rear axle ground clearance	11 in.
Chassis frame	8 in. channels
Front axle frame	4 in. channels
Rear axle frame	8 in. channels

A standard type of dry disc clutch is employed. The transmission is located amidships, a three point suspension, and provides four forward speeds and a reverse. There are six spindle shafts. The gears are of nickel steel and the bearings adjustable roller. There is an ample sized side inspection plate. The low gear ratio is 73:1. Direct drive on high. This low gear ratio is held to be an advantage in starting with heavy loads, where traction is not favorable, and to be very economical on tires. The propeller shafts are tubular, there being one between the clutch and transmission and gearset and rear axle. Fabric universal joints are utilized. The shafts are always parallel to the torque rod.

The fuel supply is by gravity, a seamless steel 22 gal. tank being located under the driver's seat. It has an auxiliary supply valve and a separate drain outlet. The driver is located at the left with center control. The gearshift lever gate has offset slots. The usual accelerator is provided.

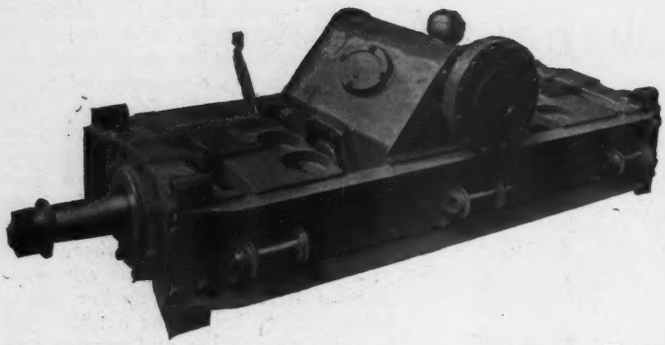
The dashboard is an iron and wood construction and has a hinged panel for inspection and for admitting heat to the driver's compartment. The hood is sheet steel panels with four brass hinges and four fasteners on the frame. The fenders are of steel with fender irons on the outside and the steps are two hardwood boards back of and clear of the fenders. The cab is of structural steel and wood with solid steel stanchions secured to the dashboard. The seat box is similarly constructed. There are compartments on either side of the fuel tank and the doors are provided with locks. The driver's floor is of wood and it is not inclined. The spring cushions are to be rattan with similar material for the seat back. The equipment comprises two side oil lamps, tail lamp, whistle, special tool kit and rear number plate straps. The standard colors are red, gray or green with black striping.

To Build But One Model

It is the intention of the company to concentrate on the one model which is said to have given unusually large tire mileage in service. It is also stated that approximately 80 per cent. of the load is distributed over the rear axle and that due to the correct proportioning the chassis



To Indicate Control the Driver Backed Rear Wheel on Stringer of Wharf. The Illustration Also Shows the Three-Point Feature of the Rear Axle, Front Radius Rod and Method of Mounting Rear Springs



The Three-Point Rear Axle
Which shows radical departure from conventional design.

will not skid. The object of the designer was to produce a truck requiring the minimum of attention and the matter of lubrication is an example. There are but four grease and two oil cups on the chassis. The oil cups, which are of the reservoir type, are located on the steering knuckles and two grease cups on the water pump and one each on the steering gear and thrust bearing of the clutch. The balance of the components is lubricated by a tube or pipe method and the supply is held to be sufficient for several months. Each oil lead has a drain plug at lowest point so that the system may be flushed with kerosene before renewing the supply of lubricant.

Nash Chassis All Pneumatic Equipped

All of the four exhibits of the Nash Motors Co., Kenosha, Wis., were equipped with pneumatic tires. The line included the Nash Quad and two of the 2-ton chassis were fitted with bodies constructed for customers, one being for an oil company and the other a meat concern. Both were attractive and striking examples of the body builder's art. The Nash Quad was displayed with a dump body and another chassis was fitted with a winch and reel of cable, etc. There was also a panel body job.

Selden Shows New Five-Ton Model

The Selden Truck Corp., Rochester, N. Y., displayed in addition to a 1½-, 2½- and 3½-ton chassis, a new 5-ton chassis which was exhibited for the first time. It has a Continental engine with Stromberg carburetor, Eisemann magneto, Brown-Lipe clutch and a four-speed transmission located amidship. The rear axle is a Timken worm and the total gear reduction on high is 10.25:1. The 3-ton model was displayed with a hoist body. One of the features of the exhibition was the "1877" Selden, which attracted a great deal of attention.

Service Display Very Attractive

The Service Motor Truck Co., of Wabash, Ind., which makes a complete line of seven models ranging from one to five tons, exhibited practically the complete line. One of the attractions of this exhibit was the 1½-ton job that was entered in the recent National Truck Tour.

Farm Truck Feature of Graham Exhibit

The center of interest at the exhibit of Graham Bros., Evansville, Ind., and one that drew the agriculturalists as well as those interested in the high speed 1½-ton truck, was a chassis of this capacity equipped with a combination farm body. Not only was it nicely finished in a striking blue color but the method of anchoring the sides and ends was very practical. Consideration has been given to the comfort of the driver, a weatherproof cab with curtains that open with the door, etc., being fitted. This affords an all-weather cab and quickly changed to meet all requirements. A new job was the 1½-ton chassis with steel disc wheels, pneumatics, electric lighting, etc.

Armleder Showed Improved Models

The Armleder Sales and Service Co., Inc., of New York, displayed two Armleder chassis—2 and 3½-ton jobs. This line of trucks which is well known and of proven worth shows a number of refinements, chief of which is the use of oil lubrication for the spring hangers and other units where grease cups were formerly employed. This company is also using the Thompson built axle, which is described in this issue.

Rainier Exhibited Complete Line

The Rainier Motor Corp., Flushing, Long Island, N. Y., exhibited seven models. Three of these were chassis comprising a 1500 lb., 2-, and 1½-ton. The 1½-ton chassis was also shown with a neat panel body, an open express and a full panel job for a New York company which bore a number 8. There was also a rack type of body with provision made for the use of a covering or tarpaulin.

Tower Combination Bus

At the exhibit of the Tower Motor Truck Company, Greenville, Mich., interest centered in this company's new bus job, which is a combination freight and passenger body. Fourteen passengers are carried in front, while freight and baggage is carried in the rear. The body was designed by Geo. Rosenberg, their eastern distributor. Twelve bodies in all are to be built and which will be used on a bus line to be run between the Catskills and Albany, under the auspices of the Empire State Bus Line, Inc. The display also included a Tower 3½-ton chassis.

Packard Displays Two Models

A pneumatic tired three and one-half-ton chassis was a feature of the Packard showing. This Model FF truck has the same engine as the five-ton models and is governed at 24 m.p.h. The tires are 38 x 7 front and 44 x 10 in the rear. A power tire pump and electric starter and light are standard equipment on this model. The other trucks shown were all Model E and were of 1½-, 2½-, 4-, 5- and 6½-ton capacity. Several styles of bodies were shown on the chassis including dump bodies, a tank body for the Tidewater Oil Co., and a Fruehauf semi-trailer.



The New Grahan One and a Half Ton Job With Disc Wheels, Pneumatics, Electric Lighting and Starting Epuipment

Autocar Brings Out New Four-Cylinder Heavy-Duty Truck

THE Autocar Co., of Ardmore, Pa., exhibited their new four cylinder heavy-duty Autocar at the New York Show. This truck is a model that gained for itself quite a reputation by successfully completing a trip from the factory at Ardmore to the Pacific Coast and back again during the latter months of summer. Any type of body may be adapted to the Autocar chassis. The accompanying illustration shows the Autocar equipped with a furniture van body, being one of those exhibited at the show.

The following are specifications of this new heavy-duty job:

Axles—Front, "I" beam steel. Rear, "Autocar" full-floating double reduction gear drive, compound bevel and spur gear. Wheel and axle bearings, tapered roller type.

Brakes—Service and emergency. Internal expanding, operating independently, on rear wheels.

Capacity—18,000 lb. total—chassis, body and load.

Carburetor—Plain tube, float feed.

Clutch—"Autocar" dry plate.

Color—Chassis, "Autocar" red; body, optional.

Control—Irreversible steering gear, left-hand drive, center control.

Cooling System—Vertical finned tube radiator, centrifugal water pump.

Equipment—Gas headlights and tank; oil tail light; horn; kit of tools.

Frame—Pressed steel channel.

Gasoline Capacity—25 gal.

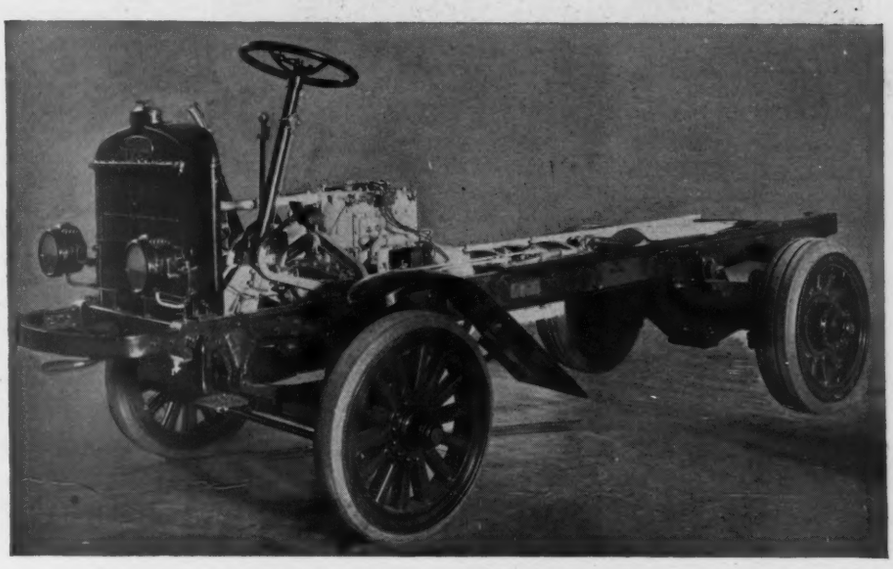
Ignition—High tension magneto.

Motor—Four-cylinder, removable head, 4¼-in. bore, 5½-in. stroke. Crankshaft mounted on annular ball bearings. 29.6 hp. N. A. C. C. rating.

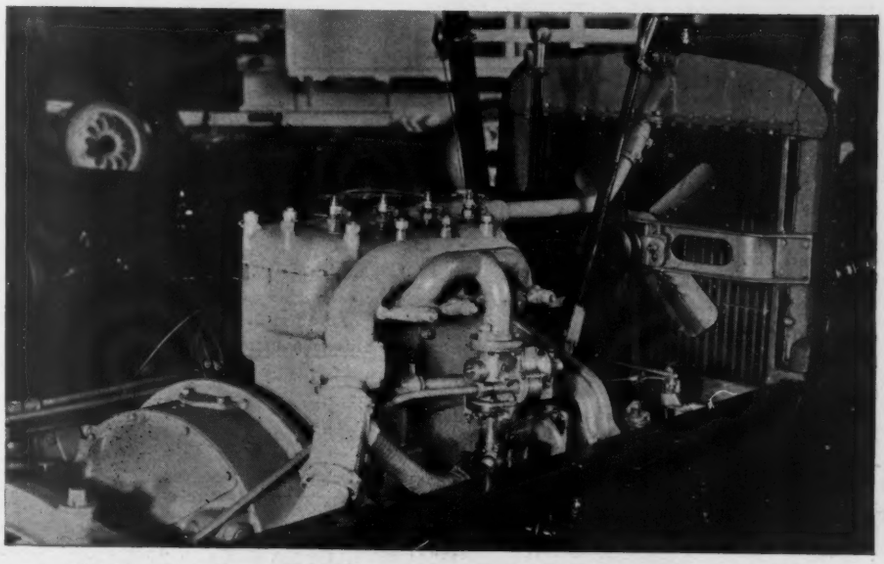
Motor Lubrication—Splash circulating system. Gear pump located in bottom of crankcase.

Speed—Automatically controlled.

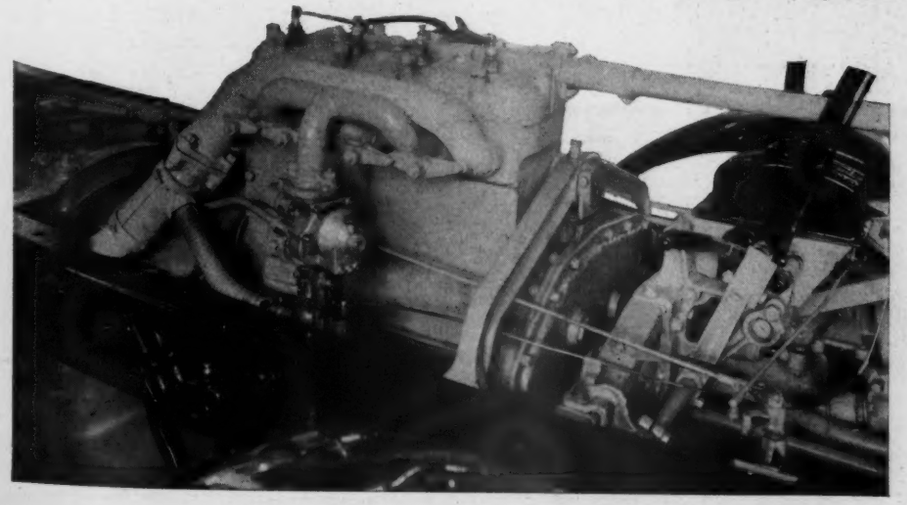
Springs—Semi-elliptic.



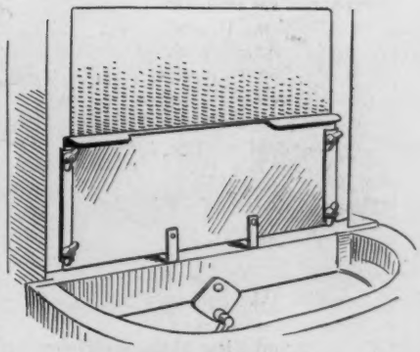
The New Four-Cylinder Autocar Job



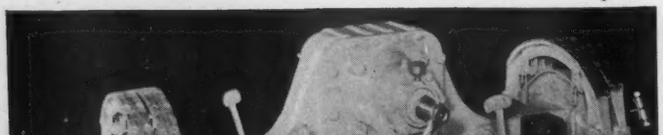
The Fan Mounting and Displacement of the Control Levers is Here Shown



A View of the Engine and Control Arrangement
Note the trunnion front support of the engine, Duplex governor, etc.



Metal Shield on the Autocar
This takes the place of makeshifts such as are usually employed by the average driver



General View of Rear Axle on the Four-Cylinder Model.

It is a full-floating, double-reduction gear drive, with compound bevel and spur gear.

Tires—Solid, front, 34 in. x 5 in.; rear, 36 in. x 5 in. dual or 36 in. x 10 in. single.
Transmission—Selective sliding gear; four speeds forward, one reverse; direct drive on high gear. Ball bearings.
Wheel Tread—63 in.
Wheelbase—120 in.

Besides the new Autocar four-cylinder job described above, this company also showed the trucks that made the test trip across the continent. Two of the new four-cylinder jobs were also shown with bodies, one a stake body and the other a moving van. The exhibit also included displays of the separate units of the new model, such as the motor, transmission, rear axle, etc. The exhibit was complete.

Acason Shows Immense Bus Job

No little attention was created at the exhibit of the Acason Motor Truck Co., of Detroit, by the showing of a 52-passenger bus body, mounted on a 3½-ton chassis. The display also included a 3½-ton chassis and a 5-ton chassis with dump coal body.

Ace Makes Debut at Show

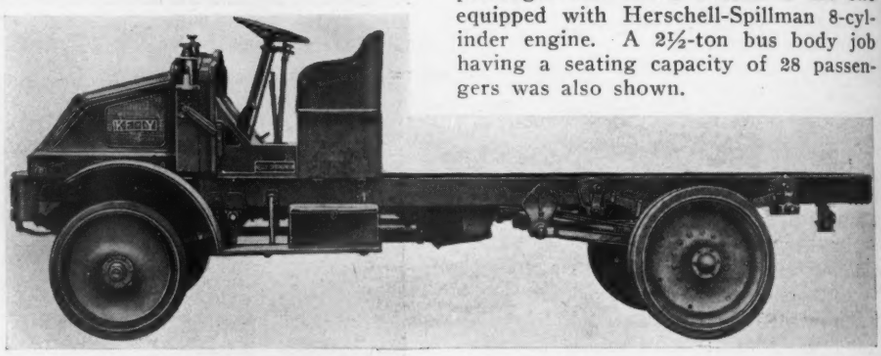
The American Motor Truck Co., Newark, O., one of the newcomers in the field, was well represented. The exhibit included a chassis of the 2½ to 3-ton size and two 1½ to 2-ton models. The latter were equipped with express body and heavy short stake body.

Rowe Bus a Feature

Rowe Motor Manufacturing Co., Lancaster, Pa., displayed a 1½-ton chassis, also a 3-ton chassis pneumatic tire equipped and upon which was mounted a 32-passenger bus. This chassis is the one equipped with Herschell-Spillman 8-cylinder engine. A 2½-ton bus body job having a seating capacity of 28 passengers was also shown.

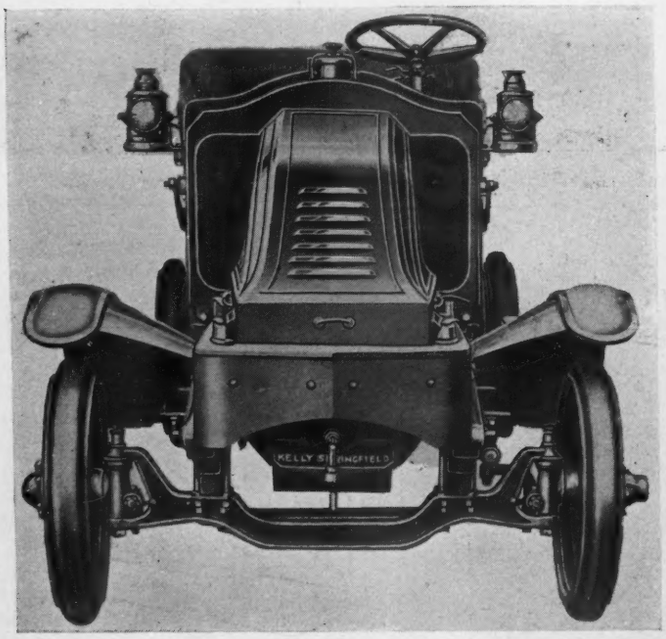
Kelly-Springfield Overhead Drive

An unusual exhibit was in the Kelly-Springfield space. Instead of showing trucks of various capacities from their line they had three trucks of 3½-ton capacity each. These trucks illustrated the choice of three forms of final drive offered by the company. These are chain, worm, and a type of internal gear drive with the drive shafts over the axle which is called the "Overhead" drive. Excepting the final drive the only other difference in the trucks is that the worm and overhead drive models have four speed transmissions, while the chain drive model has three speeds. The Model K-41, 3½-ton overhead drive, is shown in this issue.



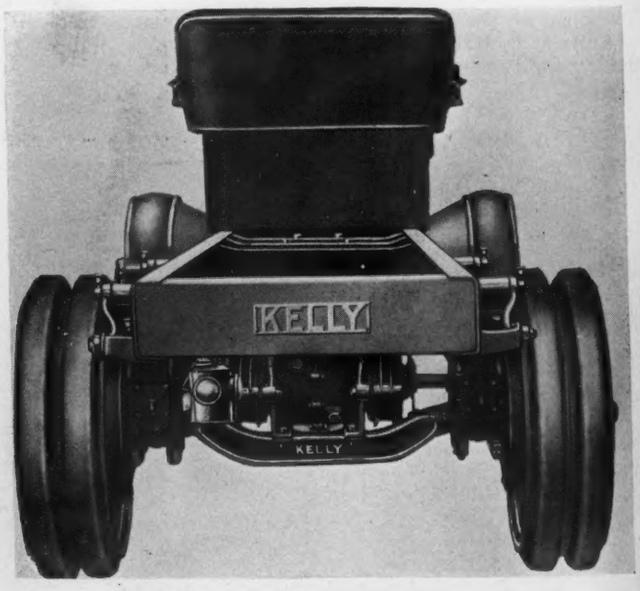
Chassis of the Kelly-Springfield Model K-41, 3½ Ton Overhead Drive Model

This is a brand-new model shown for the first time. The general construction is similar to the other models built by the Kelly-Springfield Company



Front View of the Kelly-Springfield Model K-41

This model as well as the other nine models of this company's are similar in appearance. The I-beam front axle is a special one-piece drop forging.

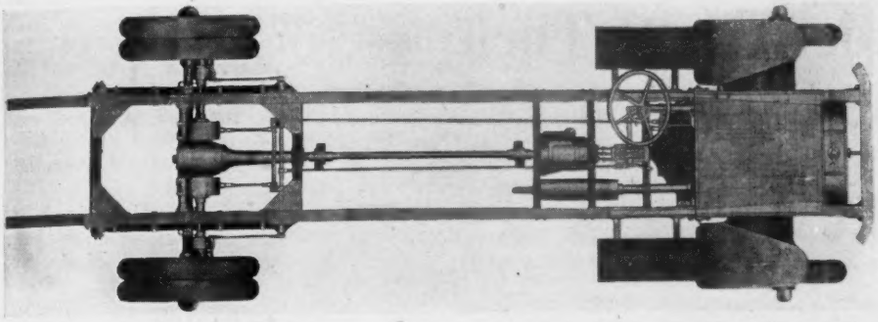


Rear View of the Kelly-Springfield

This view clearly illustrates the overhead drive rear axle. The location of the service brakes on the rear axle and the emergency on the rear wheels are also clearly shown. The load-carrying member is a special chrome-nickel steel I-beam section. The clearance from the ground to the lowest point of axle is thirteen and a half inches.

Walter Announces New Five-Ton Job

THE Walter Motor Truck Co., New York City, has brought out a new model of 5 tons capacity that has several interesting features, these including a distinctive rear axle and final drive, automatic locking differential, braking system and an electric starting and lighting system. The Walter Model S, which is to be distributed by the Walter Sales Co., Inc., 605 Fifth Ave., New York City, contains a rear axle of the internal gear type. The load carrying member is a solid steel forging and is so dropped that the rear axle and that the axle can deflect without binding action on the bearings and that the construction permits of inclining the rear wheels so that both of the dual tires meet the camber of the road instead of concentrating the load on the inside tire. Better traction is also emphasized.



Plan View of Walter Five-Ton Chassis, Having Novel Type of Internal-Gear Rear Axle, Automatic Differential Lock and Brake Suspension

springs set below the wheel centers. This construction with the use of a practically flat type of spring, affords almost a straight line drive. Advantages claimed for this design are increased flexibility and better shock absorbing qualities without increasing the possibility of spring breakage.

How Design Differs

The rear axle differs from conventional practice in that the differential and service brakes are suspended in the frame and are not mounted on the axle. The drive is taken from each side of the differential by means of a double universal shaft to the pinions which drive internal gears mounted in the wheels. The drive pinion engaging the internal gear is mounted in an unusual manner in that there is a bearing on each side of the pinion instead of a single bearing. It is claimed that with this method of mounting that no matter how great the stresses on the pinion it cannot be sufficiently deflected to destroy the full face contact of the gear teeth. A large pocket or reservoir cast around the pinion retains an ample supply of lubricant at the pinion and bearings where it is most needed. The pinion has 14 teeth, three of which are continuously in contact with the internal gear, making for low tooth pressure, which with ample lubrication provides for maximum efficiency under the most severe conditions of service. The universal shafts between the differential and drive pinions operate in practically a straight line, with the truck loaded or empty, and as the universals operate at half the speed of the usual propeller shaft construction longer life and greater efficiency is claimed. It is also stated that there is less unsprung weight with the of the worm gear to drive the worm. Use is made of this principle to secure the locking action and at the same time retain an efficient compensating differential action essential for making turns. It is held that with the construction both driving wheels will slip together and that one wheel will not spin when the other has traction. Tire and fuel economy is claimed of the design.

Automatic Differential Lock

The Walter automatic differential lock is of a patented worm and gear type, the differential employing the basic principle of the worm steering gear to obtain the locking action, that is, the inability

Powerful Brakes a Feature

The Walter chassis has been designed to afford a straight line drive; that is to say, the bevel drive is in alignment with the driving shaft of the transmission, and two flexible disc type universals are employed. The brakes should be unusually effective and serviceable. The service brakes are located on either side of the differential and have the advantage of a 5 to 1 reduction of the wheel gear. As they do not rotate at propeller shaft speed, smoother action and greater efficiency are claimed. The emergency brakes also have powerful linkage, are of the contracting type operating directly on a 21-in. drum cast integral with the rear wheels. The two systems are entirely separate. Adjustment for wear is easily made and the brake rocker shafts are so carried that the possibility of binding is avoided. The driving and braking stresses are absorbed by the rear springs.

The rear springs are mounted below wheel centers, are 50 in. long, 5 in. wide and the leaves are 7-16 in. thick. They are mounted underneath the frame side rails to eliminate twisting stresses on the frame and the spring bolts are 1¼ in. diam., hardened and ground, and are drilled to provide an oil reservoir. The spring brackets are sturdy and well anchored to the frame. The front springs are semi-elliptic, 48 in. long and 3 wide. The frame is of the flexible type, of pressed steel, 8 in. deep and has a 3-in. channel. The side rails and cross channels are made absolutely straight and the front end has a sturdy bumper that is easily displaced and repaired if damaged by accident. The cross frame members, spaced equi distant from the rear axle, are sturdy and reinforced by unusually large triangular gussets. The total length of frame with bumper is 248 in. standard and 224 in. for dump type of chassis. The width of frame, overall, is 36 in., tread is 66 in. Total width of chassis is 84½ in.

Electric Starting and Lighting

The wheelbase is 168 in., standard; front axle clearance 14 in.; height from top of frame to ground when loaded 37 in. The loading space back of driver's cab is 12 ft. 6 in. That for a dump chassis is 10 ft. 6 in.

The engine is a 4-cylinder with bore of 4½ in. and stroke of 6¼, having a hp. of 32.6 S. A. E. rating. It is of the long



Three-Quarter View of Chassis, Showing Drop in Load-Carrying Rear Axle

stroke heavy duty truck type, has detachable cylinder heads (the cylinders are cast in pairs), is lubricated by the full force feed system and is equipped with an automatic type of governor. The conventional three-point suspension is employed and the gear set is located amidships affording four speeds. It has a big low gear reduction. Ignition is by a Simms magneto with impulse starter, and the starting and lighting system is a Westinghouse. The battery is a special truck Exide. The fuel supply is by gravity, a 30-gal. tank being located under the driver's seat.

The front axle is of the Lemoine type and has the steering pivot placed very closely to the plane of the wheel, making for ease in steering. The steering gear is of the worm and nut type with the spark and throttle controls on top of a 22-in. wheel. The driver is placed at the left with center control. The radiator is of the tubular core type with cast header and sides. It is protected by a guard and the bumper. The wheels are Dayton, hollow spoke and rim type, with 36 x 6 in. solid, single, in front and 40 x 6 dual rear. The driver's cab, which is standard equipment, is fully enclosed, and has the ventilating, rain vision type of windshield.

On the 2-ton truck the transmission is mounted in unit with the power plant, while on the 3½-ton model it is mounted amidships in a position well suited for the power take-off mechanism necessary in the event of using the hydraulic hoist.

The engine on the 2-ton model is an I T O Buda, cast in block with a 4-in. bore and 5½-in. stroke. A road speed of 15 m.p.h. is obtained at 1100 r.p.m. of the engine. The carburetor is a Stromberg and ignition is by magneto. The cooling system includes a water pump. The steering gear is of the worm and nut type, mounted on the left side with the column at a convenient angle. The control members are mounted in the center.

The front axle is a Shuler Model 550. The rear axle is a Clark internal gear, Model No. 2D with a ratio of 8:1. The front and rear tread is 58 in. and the wheelbase 150 in. The wheels, which are made of wood, may be equipped with either solid or pneumatic tires; front solid 36 x 4, pneumatic 36 x 6; rear solid 37 x 7, pneumatic 40 x 8.

Power is carried through a dry plate clutch to the transmission, which is of the selective, having four speeds of the following gear ratios: 1st, 4.8:1; 2nd, 1.7:1; 3rd, 1:1; rev., 3.5:1.

Equipment includes two oil side lamps, one oil tail lamp, mechanical horn jack, tools and governor.

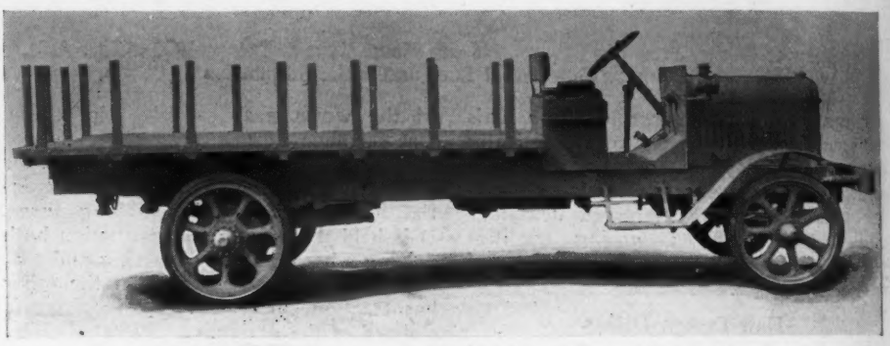
The 3½-ton truck resembles the 2-ton truck; in many respects the differences include in the following units: Twin-City engine, front axle, Timken-Detroit, rear axle, Timken worm and Smith malleable iron wheels.

Two Twin-City Models Make Their Debut at the Exhibit

THE Minneapolis Steel & Machinery Company, Minneapolis, Minn., has recently placed on the market two new models, a 2-ton and a 3½-ton Twin City truck.

In the construction of both of these models the truck adheres to conventional design, and is intended for a general purpose machine. A medium length wheelbase with a medium height chassis has been selected, together with a medium normal speed. The company has endeavored to choose the various units of both in an unbiased manner, accepting them only after due trial and test. In both models a structural steel frame was decided upon, since this company is one of the largest structural fabricators west of Chicago.

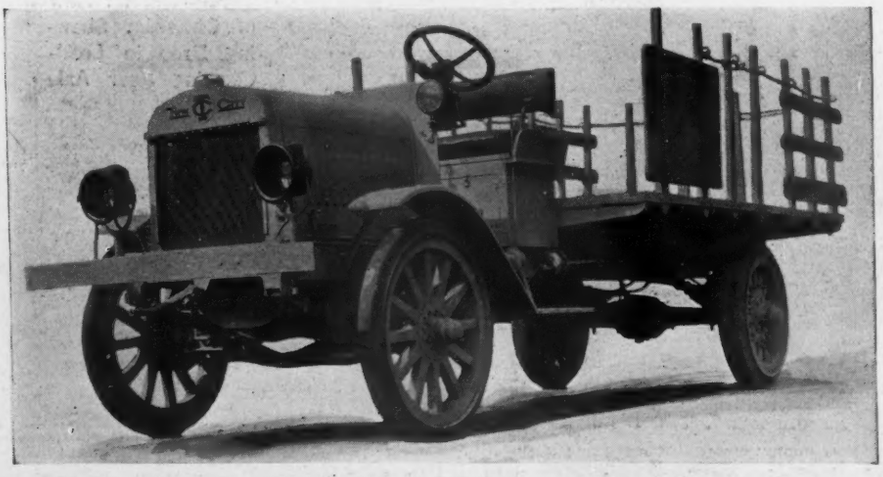
Officials of the company have come to the conclusion that on a 2-ton truck, for lighter hauling, the Hotchkiss method of mounting the rear springs is very acceptable, and they have so designed this model. They have concluded that on the 3½-ton model the radius rod construction is necessary since they intend to provide it with a dump body. In this model the radius rod construction is very desirable, as such a large percentage of the pay load is imposed on the rear axle during the dumping operation. In supplying the 3½-ton truck with the dump body and hydraulic hoist the frame is merely cut off behind the rear spring shackle, other details being left, the same as in conventional commercial chassis.



The Twin City Three and a Half Ton Truck Employs Radius Type Rear Axle

The fuel tank is mounted underneath the seat where there is also liberal space for a tool box, as will be noted in the accompanying illustration. The dash board, made of a piece of ¼-in. steel, is of very plain and sturdy construction.

The best grade of phosphorus bronze bushings with liberal diameters have been inserted in the spring shackle and similar joints so that truck will stand up.



Three-Quarter View of the New Two-Ton Twin City Equipped With Stake Body

Standardization Feature of Commerce

Adhering to its policy of avoiding any radical changes in the design of its product and making only such minor alterations as in added equipment or conveniences, the Commerce Motor Truck Co.'s exhibit may be said to be standard. This company displayed four models, including 1- and 1½-tons and four were pneumatic equipped. The 1-ton chassis featured 35 x 5-in. pneumatic cords and the 1½-ton model was fitted with 36 x 6-in. cords, both of which are held to be amply oversized. The bodies included a stake or farm type, an express and a dump. No changes are to be made by this company in design during the coming year.

Bethlehem Introduces New Three-Quarter Ton Truck at the Show

THE line of Bethlehem trucks as exhibited at the New York Show by the Bethlehem Motor Corp., Allentown, Pa., was featured by a new ¾-ton model. This chassis, which weights 1500 lb. exclusive of weight of body, is known as the Model K ¾-ton job. The engine is a four-cylinder L head type cast in block, with a bore of 3½ in. and a stroke of 5 in. The crankcase assembly affords easy access for adjustment or repairs, as the crankcase is split on the crankshaft center. A constant level oiling system is also maintained. An adjustable Borg & Beck single-plate dry-disk clutch transmits the power from the engine to the sliding gear Detroit transmission. The gearset provides three speeds forward and one reverse. All gears and shafts are made of chrome nickel steel, heat-treated, hardened and mounted on ball bearings.

The drive, Hotchkiss type, is through a tubular shaft, and includes Spicer universal dustproof joints. The spiral-bevel-gear rear axle is of Standard Parts make. All gears are of chrome nickel steel, heat-treated and hardened. This assembly is provided with exceptionally large wheel-bearing spindles.

Ignition is provided by a DU-4 Bosch high tension magneto, and includes spark plugs of Bethlehem make. Gray & Davis system of starting and lighting system with a Willard storage battery is used.

The front axle is of the conventional "I" beam section with drop forged nickel steel heat-treated spindles. It is manufactured by the Standard Parts Co. The steering gear is of the worm-and-nut type and includes an 18 in. hand wheel. It has been assembled in the chassis with the view of obtaining a minimum turning circle with ideal steering conditions.

Carburetion is by a Stromberg. Fuel is fed by gravity from a gasoline tank mounted in the cowl. A sediment trap in this system keeps the carburetor and engine free from all foreign matter.

The cooling fluid is circulated by a thermo-syphon system especially designed to meet the requirements of hard service. The radiator is of pressed steel shell construction with ample sized core. It is mounted on cushions with floating spring suspensions. The springs front and rear are semi-elliptic of chrome vanadium steel and guaranteed for maximum flexibility over the roughest roads. The front members are 36 in. long and 2 in. wide and the rear 50 in. long and 2¼ in. wide. All the spring and shackle pins are oiled continuously from patented magazine oilers. Each spring bracket holds ¾ pt. of oil which is fed continuously to every spring pin, and the seepage is used to lubricate the spring leaves.

The frame is of pressed steel construction, the channel section being 3-16 in. thick. The frame is 32 in. wide at the rear and is 175 in. long. The depth is 4½ in. This frame is well reinforced with cross members and brackets, and are hot riveted.

The wheels are of the artillery type and contain 14 spokes both in the front and rear and are equipped with 34 in. x 4½ in. cord pneumatic in the front and 35 in. x 5 in. in the rear. Taper roller bearings are provided for the wheel hubs. The wheelbase is 125 in. and tread 56 in. The service brakes are of the double acting external contracting type on the rear wheels and are exceptionally large.

The chassis equipment includes electric head and tail lamp, ammeter, mechanical horn, tool kit, jack and cowl complete, ready for body with seat.

The extra equipment includes windshield, speedometer, stake body, express body open, and express body canopy top.

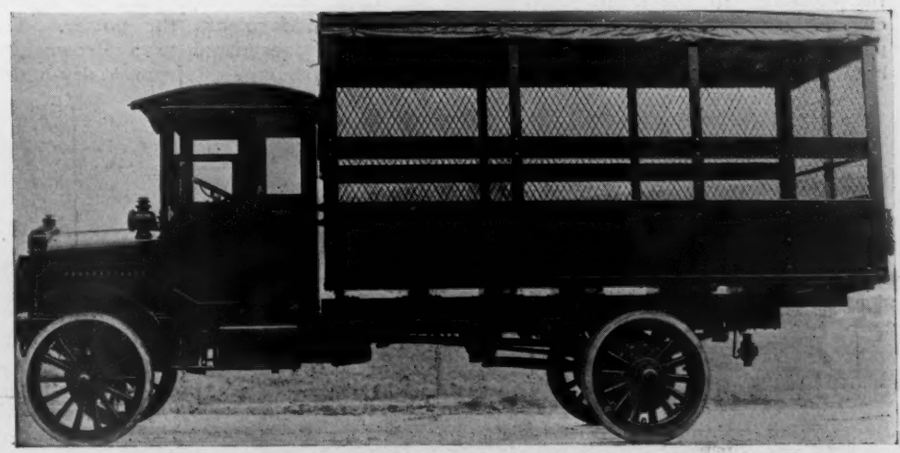


Provision for Assessability is One of the Features of the New Three-Quarter Ton Bethlehem Job

Pierce-Arrow Exhibit

Pierce-Arrow Motor Co., Buffalo, showed six models including one chassis. The 5-ton job equipped with the large National Biscuit body attracted considerable attention. A 2-ton job with stake body designed for tarpaulins; a 5-ton chassis; also a 2-ton moving van on pneumatic tires completed the exhibit. The big attraction however, at this exhibit was the Pierce-Arrow No. 25 truck that helped to build the armory. A circular was given out describing the work performed by this truck in carrying masonry and stones. Another interesting job was the 5-ton 11 W. B. tractor with Hvass 2000-gal. semi-trailer street sprinkler and flusher.

Stanwood Rubber Company has opened a branch at 1712 South Michigan Avenue, Chicago, Ill. J. H. Greer will be in charge as district manager. His territory includes the central western states.



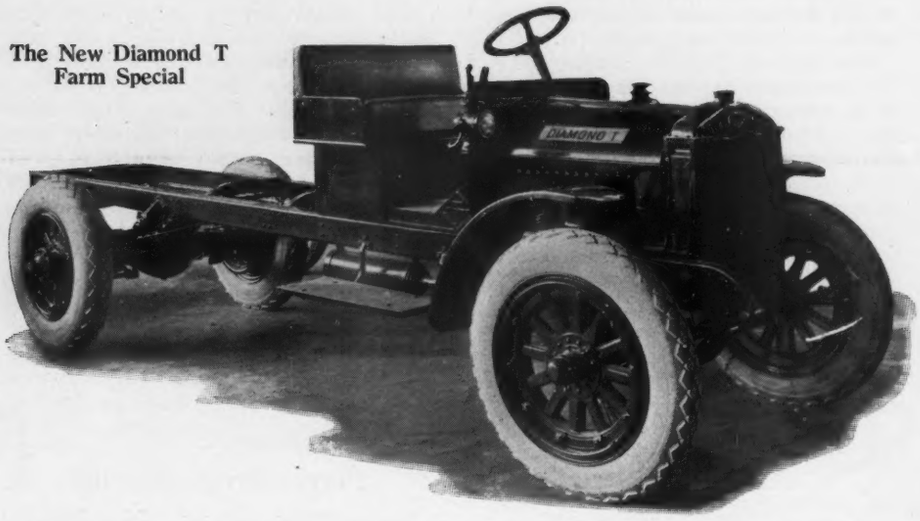
View of the New Two and a Half Ton Model K Brockway Truck With Special Body

This model, in addition to the 1½ ton model F, 3½ ton model R-2 and 5 ton model T, constitutes the new 1920 Brockway line exhibited at the New York Show by the Brockway Motor Truck Company, Courtland, New York. The 2½, 3½ and 5 ton models are all of the same general design and incorporate many improvements. Among some of the standard parts adopted are the following: Continental engine, Brown-Lipe multiple-disk, dry-plate clutch and transmission, Gemmer steering gear and metal wheels on the two larger models.

The Diamond T Includes a Farm Special

The Diamond T Motor Car Co., Chicago, showed six models in all and three of these were equipped with the big pneumatics. The models ranged from one to five tons capacity. The new 5-ton has an engine of the Class B type and electric lighting and several of the other chassis shown have engines of similar design but of lighter type. One of the features of the chassis was the method of lubricating the front spring hanger of the rear spring on the Model S, oil being fed to the bushing in the spring eye by a wick.

The New Diamond T Farm Special



The Maccar Announces New One-Ton Model

The Maccar Truck Company is in production with a new Maccar Model "S" one-ton worm-drive chassis. The Maccar line now includes the following five models: 1-ton, 1½-ton, 2½-ton, 3½-ton and 5½-ton trucks. The new job is being built along lines similar to that of the company's heavier models, differing only in the sizes of the various units. The Demountable power plant, which prevails in all the models, still exists in the new model. This feature increases the flexibility of the truck because the engine, clutch, transmission, radiator, pump, magneto, carburetor, dash, toe boards, brake and foot pedals, steering gear and all spark and throttle connections are assembled in one cradle and as a unit mounted into the frame, facilitating a rapid removal when necessary by removing six nuts and disconnecting the drive shaft brake and fuel connections, it can be removed and another unit substituted in a very short time, without disturbing the driver's seat.

Continental Engine is Used

A 3¾ x 5 in. Continental engine, cast in block and mounted on a three-point suspension, furnishes the power. The power is transmitted to a Brown-Lipe No. 30 Transmission from a dry-multiple-disk, Brown-Lipe Clutch. The propeller shaft consists of a Spicer shaft and joints and connects up with a worm-drive axle of Timken make, having a ratio of 6 1-5 to 1. Positive braking action is said to be secured from both the service and the emergency internal brake, both expanding direct on the rear wheels.

The Stromberg carburetor is fed by gravity from an 18-gal. tank, located under the driver's seat. Ignition is through an Eisemann high tension S-4 magneto.

Effective cooling is provided by a system that includes a vertical tube and fin type radiator of own make, a fan and a circulating pump.

The frame is constructed of channels manufactured by the Parish Company, having a top flange of 5 1-16 in. x 2¼ in. and a bottom flange of 2¾ in. x 7-32 in.

All shock and vibration is taken up by semi-elliptic, steel, Merrill springs. The front springs consist of seven leaves and are 2 in. wide and 40 in. long. The rear springs consist of ten leaves 2 in. wide and 52 in. long.

Steering is through a gear of Ross make of either the irreversible or the worm and nut type, and is located on the left side. The gear shift and levers are controlled from the center. Spark and throttle is on the steering wheel. Foot accelerator.

The wooden wheels which are of the artillery type and Schwarz make comprise 12 heavy, square spokes, 1½ in. and 1¾ in., front and rear, respectively. These wheels may be equipped with either solid or pneumatic tires. The type of tire to be used depends entirely upon operating conditions and as the tires on this chassis are interchangeable this truck can be adapted to any traction condition.

The length of the wheelbase is 135 in. The distance back of the driver's seat is 112 in. and the overall length is about 205 in. Chassis weight is about 3600 lb.

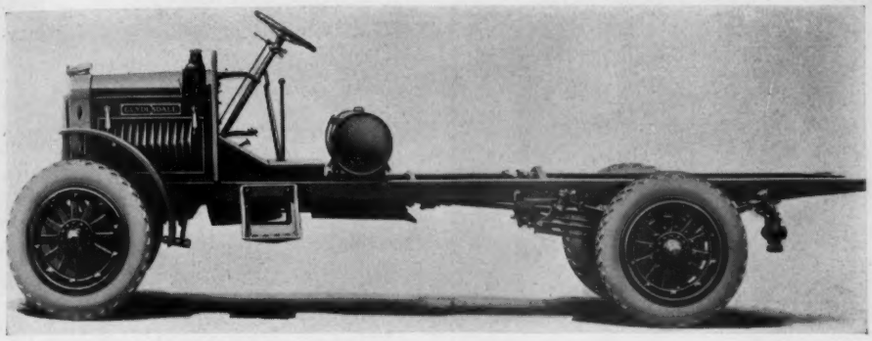
Equipment includes the following: Side and rear oil lamps, Kellogg tire pumps, extra rim and repair kit, horn, tool box, jack and complete set of tools, front bumper, driver's seat, a 40-spring upholstered cushion and comfortable padded back.



Looking Down One of the Aisles, Bus Bodies Were Much in Evidence

The Clydesdale Exhibits Two New Models

The growing need for trucks of light capacity in practically all lines of business and the Clydesdale Motor Truck Co.'s desire to provide the trade with a job of this type, has resulted in the production of two new models of lighter capacity, which were shown for the first time at the New York Show. They are known as Model 32 of 1-ton capacity and Model 42 of 1½-ton capacity. The Clydesdale line, in addition to the new models, now comprise trucks of 2-ton, 3½-ton and 5-ton capacity.



This Pneumatic Equipped Medium Capacity Chassis Was Presented for the First Time at the Show

The "Driver Under the Hood," a well known feature of Clydesdale trucks, is also provided in these new models. This is a centrifugal governor driven from the pump shaft. It is attached to the throttle rod through a lever and a spring. The pull between the spring and the centrifugal governor is balanced. Changing the throttle lever on the steering gear changes the tension on the spring, thus changing the engine speed and the truck rate. For instance, if a truck traveling 12 m.p.h. with the engine turning over at the rate of 1000 r.p.m. is suddenly forced to travel through a stretch of sand, the engine slows down slightly and with this the Clydesdale controller. The balance between the spring and the controller is destroyed. The spring immediately begins to pull the throttle open and admits more gasoline to the carburetor, thus keeping the engine up to the fixed speed necessary to send the truck along at its pre-determined rate. When the truck strikes smooth going again the process is reversed.

A four-cylinder engine cast in block and rated at 27 hp. at 1200 r.p.m. is used. The S. A. E. rating of the engine puts the hp. at 22.5. The bore is 3¾ in. and the stroke 5 in. The engine, the multiple-disk dry-plate clutch and selective type transmission form a unit power plant. The transmission provides three speeds forward and one reverse, with a gear ratio of 3.33 to one in first and direct in third.

The final drive is through a worm drive, semi-floating rear axle assembly. A high tension magneto takes care of the ignition. Spark plugs are ⅞ in. S. A. E. standard. Fuel is fed from a 30-gal. tank by gravity to a Zenith carburetor. Included in the thermo-syphon cooling system is a radiator constructed of straight copper tubes durable and easy to keep clean. Air is drawn through the radiator by a large ball-bearing fan mounted on the end. The force feed and splash system of lubrication is used.

The steering gear is on the left side and is of the worm-and-nut type. It is provided with an 18-in. wheel.

The frames of these lighter models are of pressed steel 1½ in. deep and 2¾ x 3-16 in. thick. The maximum depth of the frame channel-deep, is in the center where the greatest load is borne. This tapers off towards the end where the load strain becomes reduced. The semi-elliptic springs are made of special alloy steel, bushed throughout and equipped with oil cups. In the front they measure 36 in. x 2¼ in., in the rear 50 in. x 3 in.

The brakes are of the internal expanding type with two sets on each rear wheel. They measure 15 in. in diam. and have a 3-in. face.

The tires are pressed on S. A. E. standard. On Model 42 they measure 36 in. x 3½ in. in the front and 36 in. x 6 in. in the rear. The solid tire equipment is standard, but pneumatic may be obtained as extra.

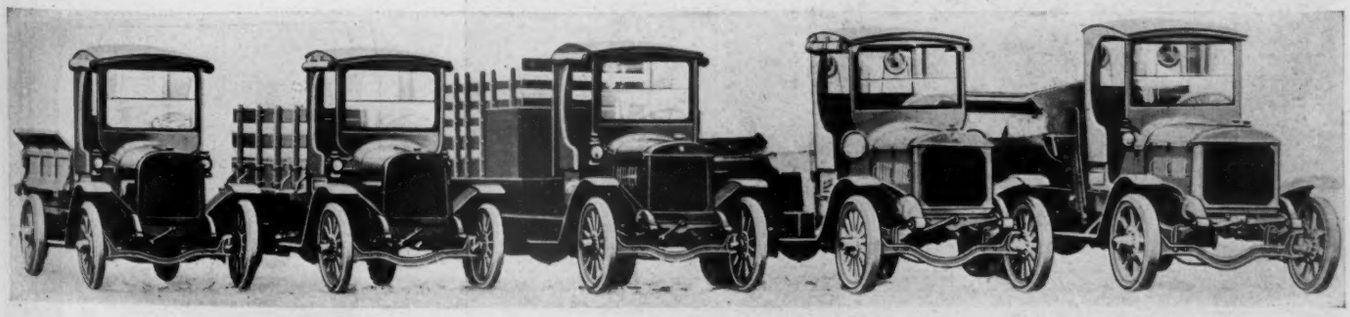
In both models the loading space is 117½ in. which is obtained from a 144-in. wheelbase. The turning radius is 26 ft. The chassis weight of Model 32 is 3400 lb. The figures for Model 42 are slightly in excess of this.

Master Exhibits New Features

A five-ton long wheelbase chassis with pneumatic tires was a feature of the Master exhibit. The model has 48 x 12 tires in the rear and 40 by 8 in the front. Other models shown were a five-ton with dump body (Hall hoist), a 3½-ton with side dump body, the 1½-ton Jr. chassis with pneumatic tires, a 3½-ton chassis, a 2-ton with dump body and 2-ton chassis with pneumatic tires. On the Master trucks a heavy band is put around the center of the springs, holding the leaves in place and replacing the usual center bolt. Buda engines Y. T. U. and A. T. U. are used in Master trucks.

Republic Features Orchard Sprayer

Besides exhibiting one of the largest number of models at the show, the Republic Motor Truck Co. showed an orchard sprayer, the only vehicle of its type at the show. This outfit includes a spray tank mounted on a 2½-ton Republic chassis, the complete outfit listing at $1800 f.o.b. factory. This model was equipped with solid tires and Foley traction rims. The other models included a lumber wagon, bus, chemical outfit, stake body job on a 3½-ton chassis, open and closed express bodies, etc. All told the Republic display included twelve models.



The Complete Acme Line of Worm-Drive Motor Trucks as Seen at the New York Show. The Acme Line Illustrated Here, Consists of 1, 1½, 2, 3½ and 5 Ton Models

The truck at the extreme left shows model B, one-tonner, equipped with Acme standard express body, finished in the natural wood. Second truck model F, 1½ ton, equipped with Acme farm body, also finished in natural wood. Third truck, model A, two-tonner, equipped with a standard stake body. Fourth truck is model C, 3½ ton, equipped with all steel combination gravel body. Fifth truck is model E, five-tonner, equipped with all-steel coal body.

Paige Shows New One and a Half Ton Job

THE Paige-Detroit Motor Car Co., Detroit, exhibited for the first time a new 1½-ton chassis which is listed as Model 52-19. The chassis has a wheelbase of 140 in., a frame length in back of driver's seat of 10 ft. 6 in., and provides a maximum body length of 12 ft. It is equipped with 34 x 5 pneumatic cords in front and 38 x 7 rear, but with option on solids. The governor, a Duplex, is set at 25 m.p.h. with pneumatics and 15 m.p.h. with solids.

The engine is a four-cylinder unit with detachable heads and the cylinders are cast in pairs. The bore is 4 in., stroke 5¼, and the lubrication system is a full pressure. The power plant is suspended at three points and is a unit with a 12-in. Brown-Lipe dry plate clutch. The carburetor is a Stromberg with dash adjustment and hot air attachment, and ignition is by a Bosch high-tension magneto. The cooling fluid is circulated by a centrifugal pump aided by an 18-in. fan, and the radiator is of the cast tank type with vertical spiral finned tube core. A radiator guard is standard equipment.

The gearset is located amidship, a three-point suspension, is a Brown-Lipe and affords four forward speeds and a reverse. The gear ratios are as follows: First, 33.9:1; second, 19.9:1; third, 12.4:1; fourth, 7:1; reverse, 40:1. The propeller shafts are Spicer as are the universal joints. The rear axle is a Timken worm and the front is of the same make. The frame is a pressed steel channel section 6 in. deep, 2½ in. flange and of 3-16 in. stock. Semi-elliptic springs are used front and rear, the front being 42 x 2½ in., and rear 52 x 3 in. The driver is located at the left with control levers at right. The steering gear is a conventional design having spark and throttle controls on column, and the accelerator is located in the toe board.

The fuel supply, a 20-gal. tank, is located under the driver's seat. The tread is standard and the turning radius is 25 ft. The standard equipment is the customary oil lamps, jack, tools, oil can, mechanical horn, bumper, speedometer, radiator guard, etc., and the dash, toe boards and steps are of steel. The special equipment comprises a weatherproof driver's cab, electric starting and lighting, two-cylinder tire pump (when pneumatics are used), power take-off, drawbar equipment and Martin fifth wheel.



Cab and Curtain Arrangement Seen on Paige Models

Union Show Two Trucks

Two trucks were shown by the Union Motor Truck Co., a 2½-ton model with pneumatic tires and a stake body, and a four-ton chassis. An interesting feature of the Union trucks is the mounting of the emergency brake back of the rear universal joint on the drive shaft, relieving the universal joints of the braking strains.



Illustrating the New Model 52-19 Paige One and a Quarter Ton Capacity Chassis Having Four Forward Speeds and Considerable Special Equipment

Metropolitan Body Exhibit

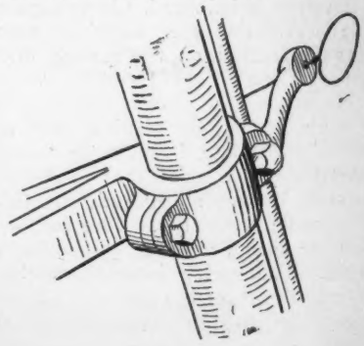
The Metropolitan Body Co., Bridgeport, Conn., showed five bodies and one cab. The feature of this line is that the standard platforms can be utilized to construct 32 different styles of bodies which permits the dealer to handle a most complete line without stocking up complete bodies and thereby saving floor space, as well as making it possible for the owner to add to his body requirements at a minimum expense. Three different sized platforms are necessary to work out this arrangement. This exhibit also included a combination dump body with double acting tail gate and removable sides.

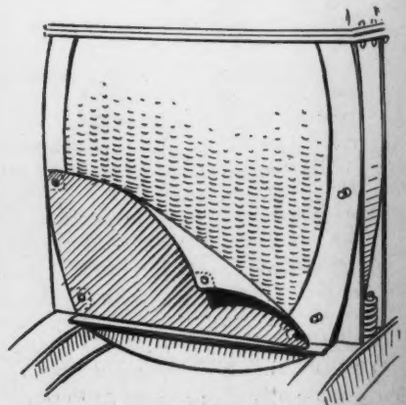
Wick Oiling on Ward LaFrance

The Ward La France Co., of Elmira, N. Y., exhibited the 2½- and 5-ton chassis. One of the features of this line is the use of wick oiling, which system was described in a former issue.

Koehler Shows New Model

The H. J. Koehler Motors Corp., Newark, N. J., exhibited a new 1¼-ton truck which was described in a recent issue of the COMMERCIAL CAR JOURNAL. This truck is equipped with the Peterson lubricating system, whereby a supply of oil is assured for long periods. It is also stated that the filling arrangement for supplying oil to the transmission case, which is a four-speed Brown-Lipe transmission, was the only one shown that can be readily filled from the side, or in other words, is readily accessible.





Two Features Seen on the Koehler Line
Above: Choke control attached to steering column
Below: Radiator protector for winter use

Gramm-Bernstein Truck for 1920

THE Gramm-Bernstein Motor Truck Co., Lima, Ohio, is announcing a new line of motor trucks for the year of 1920 which have been redesigned after a minute analysis of the Class B Liberty truck and are based upon years of successful truck building experience. This remodeled line comprises six models, a 1½-ton internal gear, and worm driven models in 1½-, 2-, 2½-, 3½- and 5-ton capacities.

The 1½-ton internal gear truck, known as Model 15, is powered by a Continental "N" engine and uses a conventional type transmission with a Clark axle. It is equipped with 36 x 3½-in. solid tires in the front and 36 x 5-in. single solids in the rear and an electric generator, battery lights and horn, tools and driver's seat is included in the chassis price, which is $1975. The frame is the standard Gramm-Bernstein type. The brakes operate on the rear wheels and are equalized. The equalizing shaft operates in oilless bearings. The two-piece driving shaft which is supported in the center is connected by three flexible disk universal joints of the company's two-bolt type.

A wooden body-sill, which is clasped on the frame with wrought iron clamps, provides a means of clamping the body upon the sills, thus eliminating the necessity of drilling holes in the frame.

The entire line of the company's worm driven trucks are very similar in appearance, varying only in size. The 2½- 3½- and 5-ton capacities are driven by Liberty truck type engines. Steel wheels are regular equipment on these models. The 1½- and 2-ton models are equipped with the latest type Continental motors.

Perhaps the most important features of the Gramm-Bernstein worm drive line is the fact that they are regularly equipped with a standard cab with doors and storm curtains that open with the door, ventilating windshield, motometer, radiator guard, radiator shutters and shroud, army towing hooks, hubodometer, metal license brackets front and rear, spring trailer drawbar supported in frame by extra A member, electric generator, storage battery, lights and horn.

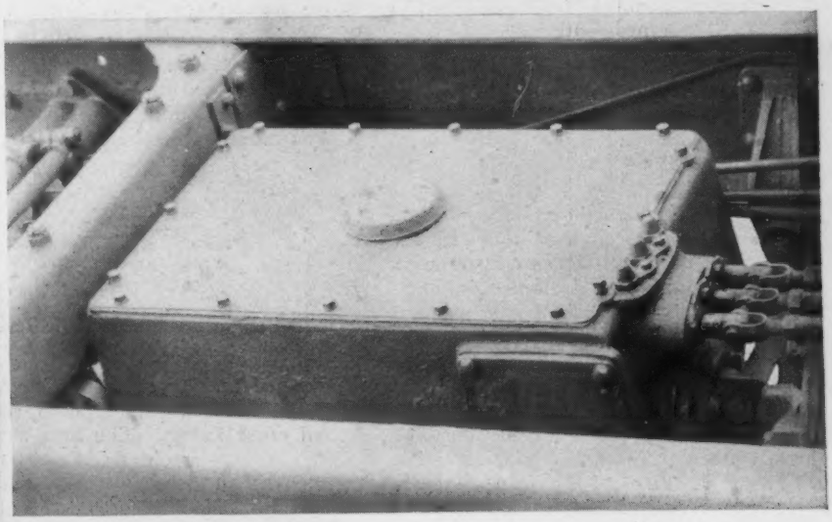
The transmission used throughout the line of worm drive trucks is of Gramm-Bernstein design. Shifting of gears is eliminated by a dry disk individual type of clutch. The gears and clutches are assembled on a six-splined shaft by an exclusive process which does away with the use of bolts and set screws. The transmission has a filler spout extending beyond frame to facilitate renewing oil.

On the 1½- and 2-ton models the gasoline tank is mounted on the dash to insure a strong gravity feed while in the three larger models the thirty-gal. tanks are mounted under the seat with a Stewart heavy-duty truck type vacuum system.

Below: Three-Quarter Front View of New Five-Ton Model, Showing the Lines and Equipment of This Model

This view shows the radiator guard, army towing hooks, steel wheels, hub odometer and all-steel car with door. Also notice the very sturdy construction of the front fender and extremely large rear axle. Hotchkiss drive is employed, the same as is used by the government.





Above: The New Model Gramm-Bernstein Non-Gear Stripping Transmission Used in the New Five-Ton Truck

This is the four speed forward and reverse transmission. This illustration also shows the plate on the side of the transmission which can be removed and a power take-off device attached in its place. Also note the brake-tumbling shaft arrangement.



Three-Quarter View of the Pneumatic Equipped Rowe Omnibus

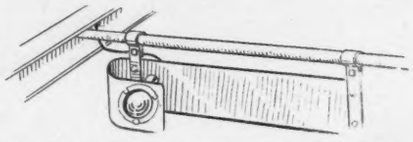
Federal Shows New One-Ton Model

THE center of attraction of the Federal Motor Truck Company, Detroit, was the first showing of the Model SD, a chassis of 1-ton capacity. It is the result of careful designing and consideration of the requirements of the particular field for which the chassis was designed. It comes with pneumatic cord tires, power driven tire pump, electric lighting, steel disc wheels, and the governor is set at 25 m.p.h. The new chassis lists at $2300 f.o.b. Detroit.

The engine is a Continental L-head type, having a bore of 3¾ in. and a stroke of 5 in., mounted at three points. Ignition is by an Eisemann magneto and the carburetor is a Zenith. Cooling is by a pump and the radiator is a tubular design. The clutch is a dry plate, a unit with the engine, and the three speed transmission is located amidship on frame cross members, has spliced mainshaft and annular ball bearings are used throughout. The Kellog pump for inflating the tires is driven from the transmission. The air line, a metal tube, leads through the side rail of the frame to a connection, the threads of which are safeguarded by a wing nut. Control of the pump is by a lever conveniently located.

Both propeller shafts are tubular and have two universal joints each. The rear axle is a Timken worm with Duplex expanding brakes. The final gear reduction is 6.25:1. The frame is a pressed steel design with a maximum channel section of five inches. Its width at front is 30½ in. and is 34 in. back of the seat. The height from ground when truck is fully loaded is 30 in. The front and rear springs are semi-elliptic, the former being 40 by 2½ in., and the rear are 52 by 2½ in., and have eight leaves. Drive is by radius rods having spherical joints.

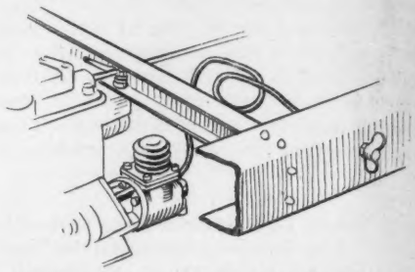
The front axle is a conventional I-beam section and the steering gear is a Gemmer with an 18-in. hand wheel. The fuel supply is located under the driver's seat; the 20-gal. steel tank supplying a vacuum tank is mounted on the dash. The wheels



Method of Suspending Electric Tail-Light on Federal

are dished and tapered disc steel, fitted with the straight side type of rim with bolted outer flange. The tires are pneumatic cords, 35 x 5 in. front and 36 x 6 in. rear. The driver is placed at the left with center control and the usual accelerator is provided.

The dash, toe boards, fenders and running boards are of pressed steel of substantial gage. The seat is an all steel construction, with spring cushions of the non-sag type, and the upholstery is not only deep and comfortable, but the back is high and designed to afford the maximum of comfort for the driver.



Air Pump Arrangement on Federal Trucks

Electric lighting is standard equipment and electric starter is listed as extra. The battery is a special truck type and is so mounted that the shocks are not communicated to it. It is readily accessible. Attention has been paid to the lubrication of parts and a high pressure grease gun is included in the tool equipment, which is stored in a tool box. The equipment also includes a radiator guard, a special Federal design of frame bars and braces of angle steel riveted together and mounted on the frame.

The total weight of the chassis is 3600 lb., the body allowance 900 lb., and the wheelbase is 132 in. with tread standard. The loading space in back of the driver's seat is 112 in. In addition to this new model the Federal line included a 1½, 2, 3½ and 5-ton models.



Another View of the New Truck Show

Equipment exhibits were located along the sides in alcoves and in the rear of the building

Thomson Worm-Drive Axle Made in One to Five-Ton Sizes

AMONG the more recent entrants in the commercial car industry exhibiting at the show was the John Thomson Press Company, Long Island City, N. Y., which concern displayed its "Thomson Built" worm driven axle. This company has been engaged in the manufacture of high grade printing presses for over 40 years and its rigid policy of quality in design, workmanship and material is to apply in the production of its axles.

The Thomson axle does not differ from conventional axle practice, but rather includes refinements or improvements. It is the result of exhaustive study of existing types of rear axles and the problems of the axle engineer, and effort has been directed toward the construction of a design requiring a minimum of attention under most severe usage. Particular attention has been given to easy and rapid dismantling of all components that may require inspection or adjustment, and statement is made that all details have been carefully studied from the viewpoint of the service station and user.

Axle Housing, Single Casting

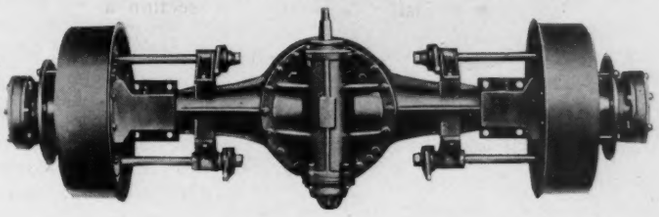
One of the features of the Thomson axle is that the one-piece certified malleable casting is well reinforced with longitudinal ribs, these being so distributed as to afford the maximum of strength with a minimum weight of material. It is stated that it requires from 60 to 70 tons pressure applied at the center of the housing with the latter supported on the spring pads, to spring the 2-ton housing one-half inch. The weight of the axle does not exceed that of any standard type of the same tonnage or capacity. The spring seats are cast integral with the housing and are constructed to conform to radius rod connections, patent to the individual truck.

The differential housing is a self-contained unit, carrying the worm, worm gear or wheel, differential and bearings. The worm is supported by a double row ball bearing at the rear and a single row at front. Ease of removal and adjustment is emphasized. The taper of the worm shaft is S. A. E. standard.

The worm is of chrome nickel steel, heat treated and ground. It is of the straight line type and is constructed to avoid the possibility of springing under excessive loads or sudden shocks. The worm gear or wheel is a special gear bronze with 60,000 lb. tensile strength and is attached to the differential housing by sixteen bolts of special material, heat treated, and the clearance of the holes in the housing and gear is extremely small. All holes are maintained at a very close limit relative to one another, so that the possibility of any relative movements between the housing and the worm gear are avoided. Another feature of the design is that the worm gear is reinforced and supported by bosses extending down to the differential housing proper, a construction preventing collapsing of the worm gear between supports. The bolts are locked by castellated nuts and these are wired in the conventional manner.

The differential is unusually sturdy and is with the worm wheel carried on ample sized ball bearings. The bearing selection throughout was made with a view of insuring long life and ease in adjustments or repairs when necessary. The differential housing is secured to the main housing by the conventional studs and castellated nuts. Easily and quickly displaced.

The axle is of the true floating type.



Thomson Axle Having Longitudinal Rits Affording Maximum Strength With a Minimum of Material.

The axles or drive shafts are of chrome nickel steel, forged in one piece, and one end is splined to fit into the differential bevel gear and the outer end into the driving nut, which is securely bolted to the hub flange. The splined or inner ends of the shafts are upset and of a larger diameter than the shafts. A slight amount of clearance in the spline at the outer end of the shaft is allowed so that natural wheel bearing wear does not impose stresses upon the shaft. It is also claimed that heavy shocks are not communicated to the axle with this design.



Showing the Shaft Slightly Displaced

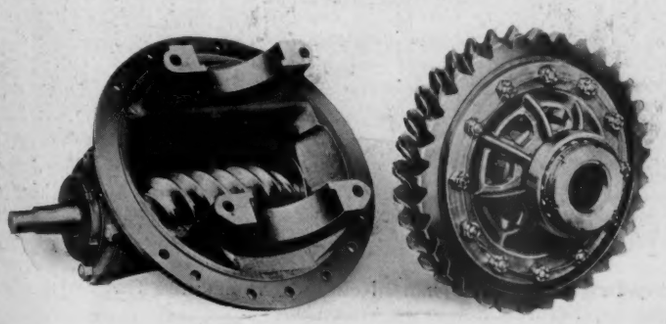
A feature of the wheel mounting is that outer wheel flange is keyed to hub

Wheel Flange Keyed to Hub

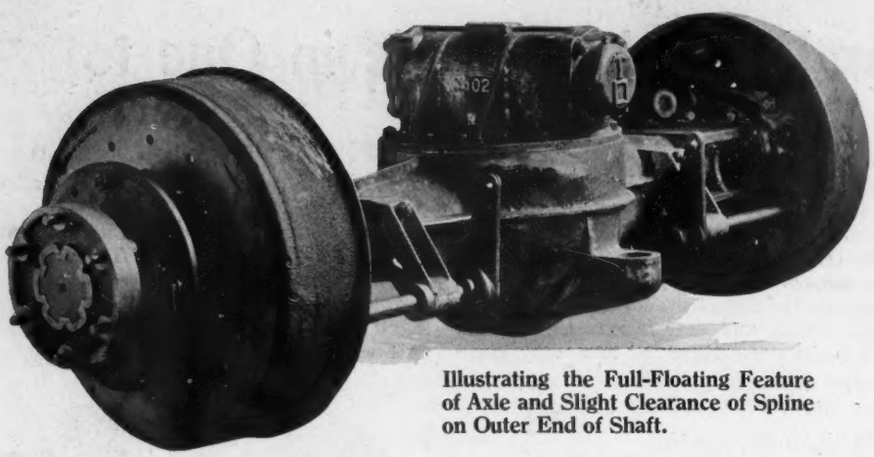
A special feature of the wheel mounting is that the outer wheel flange is keyed to the hub proper, driving on both sides of the spokes, eliminating twist on the hub bolts. The wheels are supported by large ball bearings. On the 1-ton axle there are two single row bearings in each wheel. Each bearing has a radial load capacity of 4900 lb. at 100 revolutions, and a total radial load for both wheels of 19,600 lb. The 2-ton model has two double row bearings in each wheel, and each bearing has a radial load capacity of 7920 lb. at 100 revolutions and a total radial load capacity of 31,680 lb. On the 3½-ton are two single row bearings in each wheel. The front bearing has a radial load capacity of 13,920 lb., and the rear bearing a radial load capacity of 15,800 lb. at 100 revolutions, giving a total radial load of 59,440 lb. for both wheels.

The standard ratio of the 1-ton is 6.75:1. The optional ratios are 7.75:1 or 8.75:1. The standard ratio of the 2-ton is 8.25:1. The optional ratios are 7.75:1 or 9:1. The standard ratio of the 3-ton is 10 1-3:1. Optional are 12:1 or 8.75:1.

The brakes are of the internal expanding cam operated type. The brake shafts are mounted in detachable brackets on either side of the axle housing, and the levers and linkage should make for very efficient braking. The levers and shafts are serrated, and adjustment is easily and quickly made. The brake assembly as a whole is well designed and the components very accessible. An innovation in hub caps is noticeable, the name Thom-



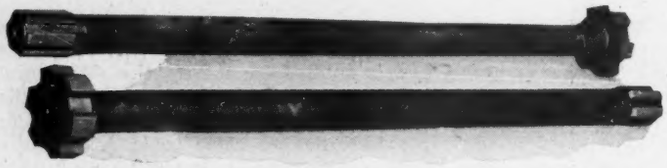
The Worm Gear is Reinforced by Bosses.



Illustrating the Full-Floating Feature of Axle and Slight Clearance of Spline on Outer End of Shaft.

son Built being cast with the hub cap, which also will bear the name of the truck manufacturer. Provision for renewing the supply of lubricant is conventional.

to present the trade with a well designed axle having a sufficient factor of safety to take care of a reasonable overload and to incorporate the same high grade material and workmanship that has made the



The Inner Ends of Axles Are Upset and of Larger Diameter Than Shaft.

The company is to produce a line of axles of from 1 to 5 tons capacity and is in production for three types at the present time. The policy of the company is

name of Thomson well and favorably known as manufacturers of printing presses. The plant is located at Nott and East avenues, Long Island City.

Hercules Heavy-Duty Engines Show Stalwart Construction

IT is the contention of the Hercules Motor Mfg. Co., Canton, Ohio, that the most efficient truck and tractor engine should not be an adaptation of previous types, but that it should be especially designed for the express purpose of heavy duty.

Following out this contention the Hercules company has developed and perfected in the past three years a line of heavy duty internal combustion engines with a number of distinctive features. Stamina has been given first consideration. The material throughout the motor has been so distributed as to withstand the maximum stresses that may be imposed when developing maximum horsepower.

One of the main features of the Hercules line is the crankshaft which is of the 5 bearing type designed for greater rigidity and elimination of deflection. It is made of chrome nickel, drop forged and heat treated. This design coupled with the generous bearing surfaces provided is claimed to prevent disalignment or whipping of the crankshaft. The five main bearings are of liberal length. The bronze bearings are lined with highest grade babbitt.

The oiling system is of the high-pressure dry-base type, the oil being drawn from a reservoir placed at the bottom of the crankcase and forcibly carried into the main oil lead, in the upper crankcase, from which main oil lead proper distribution is provided to each bearing. A gear pump is employed and located accessibly. Oil under pressure is carried up to the wrist pin bearings. The timing gears are lubricated by a stream constantly being poured over them.

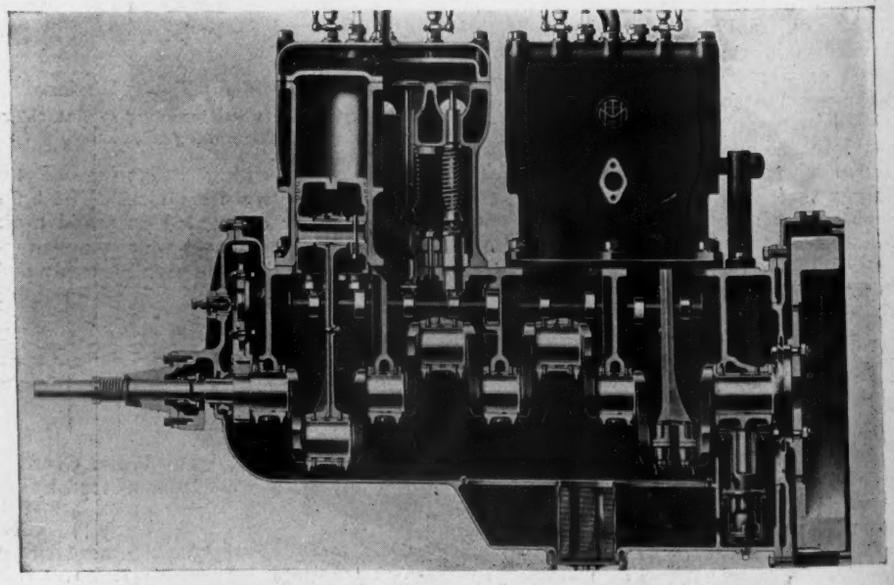
Especial attention has been given to the design of the cylinder block, valve arrangement, water-jackets and gas passages, in order to fit the Hercules for the consumption of low grade fuel. The water-jackets extend to the base of the cylinder block and a liberal space is provided around each cylinder barrel, valve pocket and port plug opening, so as to insure freedom of circulation, uniform wall temperature and absence of hot and steam pockets.

Laminated shims provide means for taking up the wear. The end thrust of the shaft is taken care of by large flanges on each end of the rear bearing.

The piston design is of the long trunk type of such construction as to be inherently in balance. Four eccentric rings maintain even wall pressure. The piston pin is locked firmly in the piston bosses.

The removable oil pan permits accessibility to all bearings.

The one piece separable bell housing construction provides a very substantial support for a unit power plant as well as providing the means of supporting the engine to the truck or tractor frame work. Three-point suspension is used, the front end being a trunnion concentric with the crankshaft, making a true three-point suspension which prevents torsion of the frame members transmitting any stresses to the engine.



New Heavy-Duty Hercules Engine. Note the Five Bearings That Securely Retain the Crankshaft

Trublpruf Tires

A punctureless rubber tire, claimed to have the resilience of a pneumatic tire, was featured by the Lambert Tire & Rubber Co., Akron, Ohio, at the Show.

This tire primarily is made up of three stretchless cord belts that encircle layers of cushion rubber, thus distributing the shock vibration, not at the particular point of contact, but around the entire circumference of the tire. Air chambers are so faced as to work in perfect harmony with the corded belts to give the maximum resiliency. The tread is constructed of extra heavy rubber.

Aluminum Wheels for Motor Trucks

Aluminum Castings Company Developing Lynite Wheel Which Will Cut Down Unsprung Weight, Effect Important Operating Economies and Improve Truck Efficiency

ONE of the most interesting announcements in recent years is the Lynite truck wheel now being developed experimentally by the Aluminum Castings Co., of Cleveland, O. The Lynite wheel, which was exhibited at the New York Show and will also be shown at Chicago, is a one piece aluminum alloy casting made in either spoke or disc type designs. Extensive road and laboratory tests to date indicate that the new wheel, unconventional in design as well as in material, possesses all the desirable features claimed for the wood or steel wheel and enjoys certain very important advantages. The Lynite wheel weighs about half as much as any other wheel on the market, and will, therefore, decrease the weight below the springs (the unsprung weight) very materially and at the same time guarantee ample strength.

Today there exists among motor vehicle designers an amazing lack of interest in and consideration of the extremely important part played by the wheels. The engineer is quite liable to state that the wheels on the market today are "good enough" and that they give him less trouble than any other part of the car.

While this view, of course, is true in part, it is not so obvious that what may seem "good enough" may not be made a "little better" and effect a fundamental improvement in the performance of the whole car. It is with this problem of increasing the total efficiency of the car by the introduction of a superior wheel that the leading engineers and metallurgists of the Aluminum Castings Co. are actively concerned.

The importance of reducing the weight of the unsprung portion of the chassis is generally appreciated and, on the whole, designs reveal the fact that this requirement has been carefully studied. There is, however, a wide divergence of opinion among the leading engineers as to the proper ratio between the unsprung and the sprung weight. Some hold this ratio to be 1 to 10 while others place it higher or lower as their opinions may be, but it is generally admitted that a great deal is to be gained by saving unsprung weight in the following respects: Economy in tire wear; increased carrying capacity; improved riding qualities; economy in fuel consumption, and better acceleration.

While the tendency of a wheel to leave the ground and spin is familiar to the layman, it is interesting to note in this connection an actual test. It was shown that when a truck traveling at a rate of speed of 15 m.p.h. struck a two-inch bump, the wheel striking the blow left the road and, at greatly accelerated speed, traveled through the air for a total distance of 59 in. before again hitting the ground. Contact with the ground was only after a severe bump, followed by marked slippage and excessive tire wear.

Lightness in Weight Does Not Affect Road Adherence

At first glance, it might appear that with substantial unsprung weight, as illustrated in the so-called carry-all types of motor vehicles with heavy axles and heavy wheels, there should be a more secure adherence on the road than in the case of any marked reduction in this weight, but further consideration shows this to be an error.

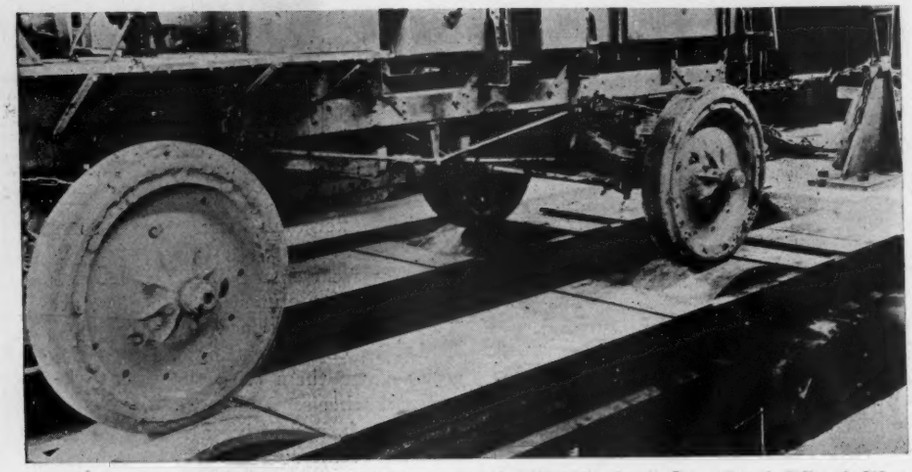
When the wheels pass over an uneven part of the road an upward impulse is given to the wheels and to all the unsprung weight supported by those wheels. To a certain extent the flexibility of the springs will relieve the impulse from being imparted to the sprung weight. The kinetic energy of the springs will return the lighter wheels to the ground in a shorter interval than it will the heavier ones. Accordingly it is evident that the upward impulse and tax on the springs is greater with large unsprung weight and that lighter wheels will hold the ground better than heavier ones. In consequence tire slippage and its resultant grinding wear is materially reduced. To illustrate this point still further, consider a truck of any standard spring suspension loaded to capacity. Remove the wheels and replace them with typical cast iron railroad wheels. Drive this car at a rate of 20 m.p.h. and strike a rock projecting 2 in. above the surface of the road. What happens! The wheel will be thrown upward, causing a compression of the spring which will only partially absorb the shock, the remainder of which will be transmitted to the body of the car. Now replace these wheels with a set of paper mache. Drive this car at the same rate of speed strike the above-mentioned rock and what happens! If the wheel can stand the blow, it will be thrown upward as before, causing a compression of the spring, which will again absorb the shock. This time, however, the shock transmitted to the body will be very light, for the body is so much heavier than the wheel that the springs will drive the wheel downward rather than drive the body up. It is further evident that in reducing the unsprung weight by decreasing the weight of the wheels by about one-half, that the ordinary friction between the road and the tire is lessened.



Close-up View of Truck Equipped With Lynite Wheels and Pneumatic Tires

The less weight on the tires, the less wear. The nearer the tire in use can approach its natural state, i. e., the less the compressive force on the tire, the longer it will wear. The aluminum wheels are actually easy on tires is shown by a concrete example. Over four years ago when the Aluminum Castings Co. first began experimenting with Lynite wheels, a set was put on one of the trucks of a local concern in Cleveland. These wheels with solid tires have been running constantly since that time under severe conditions, averaging over 30 miles a day. These wheels have only worn out one set of tires.

The large reduction of the unsprung weight effected by these wheels may be taken advantage of by increased capacity of the truck itself. It is found quite possible to increase the load capacity very materially provided the springs, axles, bearings and their co-ordinate parts are so designed as to allow a factor of safety consistent with the increased load. Or, with the same carrying capacity as originally intended, practically all parts can



A Two-Ton Truck Equipped With Three Lynite Wheels and One Steel Wheel Was Mounted on the Dynamometer and Run Five Hundred Miles. The Wheels Were Subjected to Over Six Million Impacts. No Flaws or Cracks of Any Kind Were Evident in Lynite Wheels.

be reduced in size and section, including tire sizes.

In order to test the strength of the Lynite wheel under severe operating conditions, the Aluminum Castings Co. has subjected it to extensive road and laboratory tests which are without exception very favorable. Among the road tests made on a large number of light and heavy trucks on solid and pneumatic tires were the usual runs over city pavements as well as cross-country trips over the worst possible rural roads. These tests extend over a period of many months and no failures of any kind have been noted.

Among the laboratory tests were those for metal fatigue, tire wear, side thrust and radial compression. The metal fatigue tests were conducted last summer. A 2-ton truck was equipped with three Lynite disc type wheels and mounted on a drum dynamometer for a 500-mile run. One of the original steel wheels was left in place. The Lynite wheels were identical in design with those regularly used on this truck with the exception of an increased section on the brake drum and the absence of a number of smaller ribs supporting the ring gear. The following show the weight of these wheels:

Lynite wheel No. 104.....81¼ lb.
Lynite wheel No. 112.....79¾ lb.
Lynite wheel No. 113.....84½ lb.
Steel wheel ..... 248 lb.

An accompanying illustration shows the truck mounted on four cast iron drums, 16 ft. in circumference with four cleats made of ½-in. round stock ¾ in. high, bolted at equal intervals around the circumference of the drum. The drums on the same axle have the cleats staggered, i. e., the cleats on one drum were located 45 deg. ahead of the cleats on the other drum at the opposite end of the axle. The truck was secured to the stand by hold down chains in the front and rear and supported by stay rods connected to the truck and to the side of the building. The truck was driven under its own power at an average speed of 15 m.p.h. for 500 miles.

As the circumference of the drum was 16 ft. there were 330 revolutions per mile. Each drum had four cleats and accordingly there were 1320 impacts per wheel at 15 m.p.h. From this it is calculated that there were 19,800 impacts per wheel per hour or about five impacts per second. As the tests consumed 33½ hours, each wheel was subjected to 6,009,300 impacts.

Owing to the severe nature of this test, much time was lost in making necessary repairs and in replacing broken parts of the truck.

The test occupied 33 working days but only 33½ hours of that time was the truck actually operating, due to the necessity for making repairs to various parts. So great was the vibration and noise of the truck wheels pounding upon the dynamometer drums that one of the laboratory attendants was forced to go to the hospital to have an operation performed on one of his ears.

While the test was in progress three springs were broken and the six spring bolts which hold the leaves in alignment were sheared off. The front right spring at the front eye also broke, throwing the truck from the drums and breaking the stay rods and rear hook. These broken parts were replaced.

Upon completion of the test a careful examination of the Lynite wheels revealed no cracks, flaws or breaks of any kind and no signs of metal fatigue were visible.

Tests for side thrust and radial compression are being conducted at the present time at the laboratories of the Aluminum Castings Co. The tests are for the purpose of securing comparative data, with reference to Lynite wheels and other standard wheels. These tests are not yet complete but, so far as run, they have been very satisfactory. The metal for the new wheel is the new casting alloy recently announced and known as Lynite 145. This alloy has a tensile strength of 27,500 lb. per sq. in. and an elongation in 2 in. of 4.5 per cent.

The Lynite wheel being in one piece of aluminum alloy, which takes a brilliant polish, and having no built up portions, presents a sturdy appearance.

The lightness in weight of the Lynite wheel permits greater ease in handling it in the manufacturer's assembly room or in the local repair shop. If it were necessary to change wheels on the road, the driver could do so in most cases without assistance.

Because of the property peculiar to aluminum, namely, that it does not rust, tire change is also greatly facilitated.



Lynite Wheels Are Also Designed in Spokes as Well as Disks. They Are Made of a One-piece Casting of the New Alloy Known as No. 145

Powrlok to be Made Abroad

CLEVELAND, O., Dec. 8.—The Powrlok Differential is to be manufactured and distributed throughout England and the Continent. E. A. Vandervell will have charge of the production of the Powrloks in England. E. R. Rothermel, of England, will assist Mr. Vandervell.

The Natco Magneto for Trucks and Tractors

By C. P. SHATTUCK

THE National Ignition Company, Inc., Irvington-on-Hudson, N. Y., is manufacturing a 4-cylinder true high-tension magneto for trucks, tractors, etc., that is a radical departure from conventional practice in a number of respects. Among its features are:

A stationary high-tension winding enclosed in Bakelite and mounted on a fixed, vertical laminated core extending from bonnet to the top pole piece.

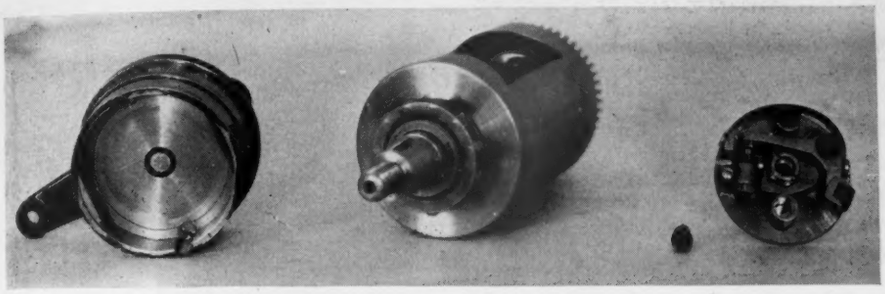
Condenser contained in a separate case and a unit with the cam carrier of the interrupter mechanism.

Straight interchangeable magnet bars mounted in parallel and united transversely at one end by a base upon which the bars rest and a bonnet overlying them at the opposite extremity. It is stated that the bars will not demagnetize and that a 1-lb. pull is sufficient.

Can be operated either clockwise or anti-clockwise without alteration.

An aluminum-alloy die cast housing with bottom with laminated pole pieces inserted in casting. Oil tubes cast in housing and provision for draining excess of lubricant.

Can be taken apart and reassembled with a screw driver; no special tools.



Showing the Armature Having a Single Winding of Heavy Wire and Ends Turned From Solid Tobin Bronze

Interrupter is conventional in design. Note slots in cam carrier, affording the thirty degree advance

Windings Are Separate

The windings of the Natco magneto are separate. The primary consists of a few turns of impregnated heavy or coarse wire wound on the conventional H or shuttle type of armature, and it is connected to the interrupter and condenser; that is, one end is grounded through a brush in the interrupter disc or plate contacting with the interrupter housing. The fixed end of the primary is connected by the screw securing the interrupter to the armature shaft. This screw carries a carbon brush which establishes a connection with the condenser which is enclosed in a moisture and heat proof case, a unit with the lever member of the interrupter. The interruption of the primary is conventional, there being the usual fixed and movable contact points, the latter being actuated by cams diametrically opposite in the condenser housing.

The separate secondary winding is a spool of the best insulated wire and is contained in a two-piece Bakelite housing that may be disassembled and winding removed by displacing four screws. The housing with winding fits over a vertical, laminated fixed core outside of the armature, but subject to the same magnetic flux. One end of the secondary winding is grounded through a screw on the bottom of the coil case. The other end is connected to a brass contact ring on the upright or vertical part of the housing. Diametrically opposite on the contact ring, which is of brass, is a sawtooth extension. A similar member is carried in the top cover or bonnet, and at right angles to it, forming an enclosed safety spark gap that is visible through a mica window.



The Natco Magneto

As it has straight features, interchangeable magnet bars, stationary high-tension winding, enclosed in Bakelite on a fixed core, and a condenser unit with the cam carrier, the magneto can be operated in either direction without alteration.

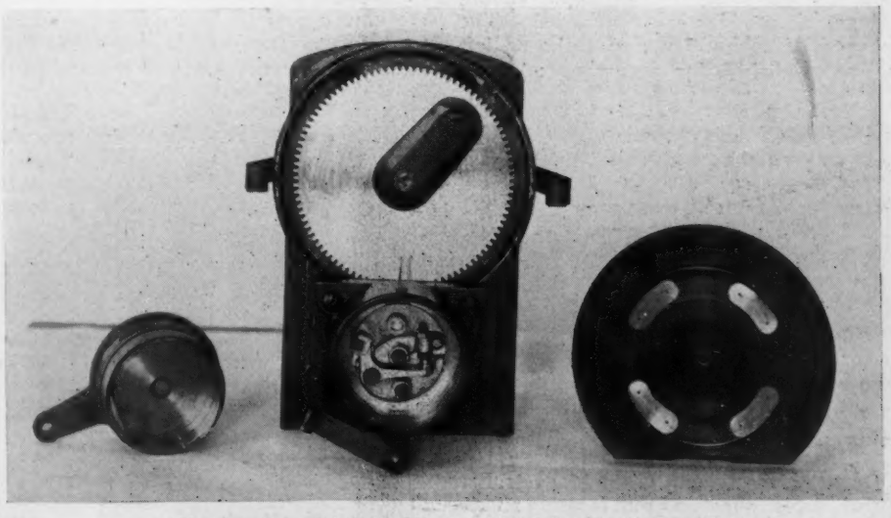
Direct Path for High Tension Current

The high-tension or induced current is conducted from the contact ring in a straight path to the distributor by a carbon brush mounted in a holder and carried in an L-shaped distributor arm in which a brass and copper segment is moulded in Bakelite. The conducting ring brush is made in two sections and connected by a spring. Distribution of the current is by the conventional wipe method. The distributor gear bearing of phosphor bronze is not only ample in size, but can be easily renewed, as it is screw retained in the die cast housing.

The core or part carrying the primary winding of the Natco armature is constructed of steel laminations, but the adjacent ends or shaft ends are turned from a solid bar of Tobin bronze, two rods extend through the ends and laminations and the construction electrically welded. Each armature is turned to very close limits and the finish throughout is unusually high grade. The armature is carried in Norma ball bearings and the driving gear is of steel, pressed on. The taper of the shaft is standard and is slotted to take a Woodruff key.

Straight, Interchangeable Magnets

In place of the familiar horseshoe type of magnets, the Natco has four straight bars of the permanent magnet type, these being placed in parallel and united transversely at one end by a base on which they rest, and by a bonnet overlying them at the opposite extremity. The bars are constructed of a special magnet steel. It



Showing the Distributor Cap and Cam Carrier Removed

The condenser is mounted on the latter. In timing, slots "R" and "L" are aligned with mark on housing and according to direction of drive

is claimed they will not demagnetize nor do they require a keeper after removal. The bars are interchangeable and the poles are marked, simplifying the reassembly of these units in the housing.

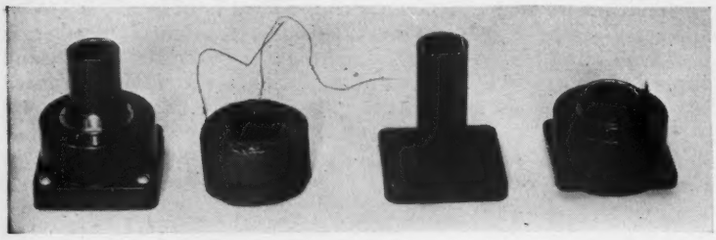
The magnet bars are rigidly retained in a vertical plane in the housing by ribs cast integral with the housing and are enclosed by accurately fitted brass plates or covers. Use of felt strips at the bottom, coupled with the close fit of the plates, exclude moisture and foreign elements. The bonnet or top cover is of laminated steel, rests on the central core and on the supports cast in the housing. This is also accurately fitted to insure the exclusion of moisture, etc. The bonnet is retained by four screws. The magneto can be mounted on an iron or steel base and it is not necessary to use a non-magnetic material in mounting.

The housing is an example of the possibilities of die casting, it being an aluminum alloy, Doehler, and the bottom and top pole pieces, which are special steel laminations, are inserted in the casting process. Steel inserts are cast in the base for mounting with standard 3/8-in. bolts. All other dimensions are standard. The center of the housing is occupied by a fixed, laminated core extending from the bonnet to the top pole piece.

The oil channels or tubes supplying lubricant to the bearings are cast with the housing and provision is made for draining any excess of lubricant. The distributor shaft bearing is counterbored and has a channel or reservoir for oil.

The Natco magneto is unique in that it may be driven in either a clockwise or anti-clockwise direction without alteration. The timing lever may be located on right or left as best meets the requirements of installation and control linkage, and the conventional timing range of 30 degrees is afforded. The change of timing lever to right or left is accomplished by removing a small screw in the interrupter housing proper. This screw registers in slots on either side of the cam carrier and the slots also limit the movement of the lever to 30 degrees.

The magneto is easily timed and changed from clockwise to anti-clockwise. There are two slots on the distributor gear marked R and L, indicating right or left, and aligning a slot with a zero mark on housing is accomplished without remeshing the armature gear, etc. Changing from clockwise to anti-clockwise with magneto installed does not affect the intensity of the spark. Use is not made of the break or separation of the contact pointings in timing, but by the marks as explained.



Illustrating the High-Tension Housing at Left With Contact Ring, Spool of High-Tension Wire and Housing Disassembled at Right.

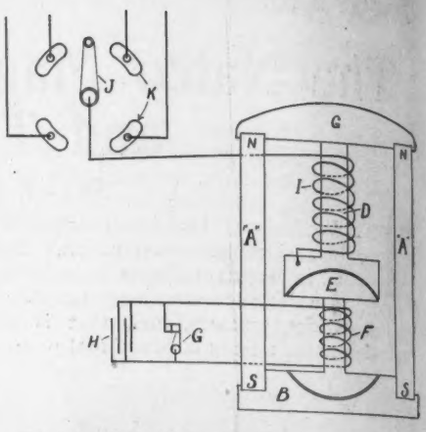


Diagram Illustrating the Relative Position of the Various Parts

A, Permanent Magnet Bars; B, Bottom Pole Piece; C, Bonnet or Top Cover; D, Top Pole and Core for High-Tension Winding; E, Armature; F, Armature Winding; G, Interrupter; H, Condenser; I, High-Tension Winding; J, Distributor Arm; K, Distributor Contacts.

The interruption of the primary occurs when the armature is in practically a vertical plane. The break, however, does not take place when the cheeks of the armature almost bridge the gap of the poles as in conventional practice as the flux or lines of force flow through the armature core when the latter is in almost a vertical plane. It is held that this keeps the armature shuttle within the influence of the poles in all positions from full advance to full retard and that utilizing the entire space of the armature for the primary, and location of the secondary, obtains a hot spark at very low engine speed, as well as makes for fuel economy. It is claimed that pitting of contact points has been eliminated.

The National Ignition Company has a factory of about 65,000 sq. ft. of floor space, has excellent shipping facilities, and is planning a large production of the magneto described which is to be known as type A-4. The company is headed by men of broad manufacturing experience and the policy of the organization is quality first. The magneto is the result of over two years' experimentation and has been subjected to severe laboratory

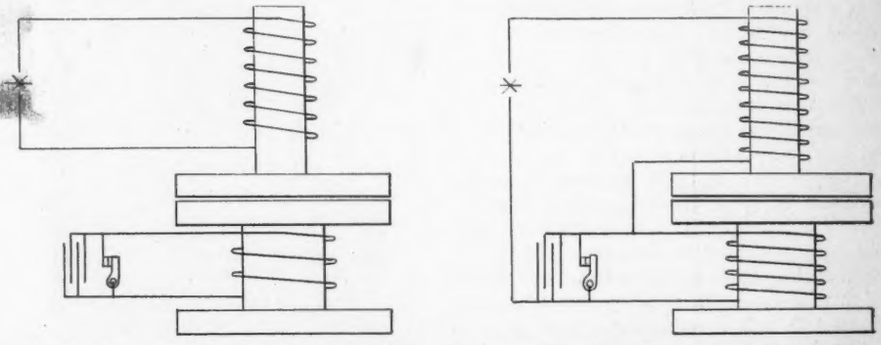
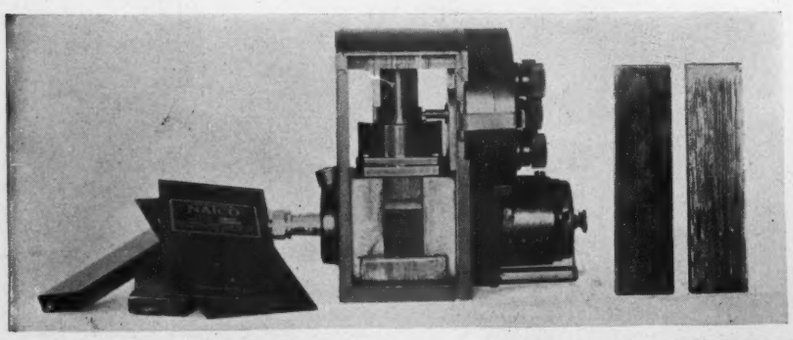


Diagram Showing Winding at Left and How It May be Wound to Increase Output at Right

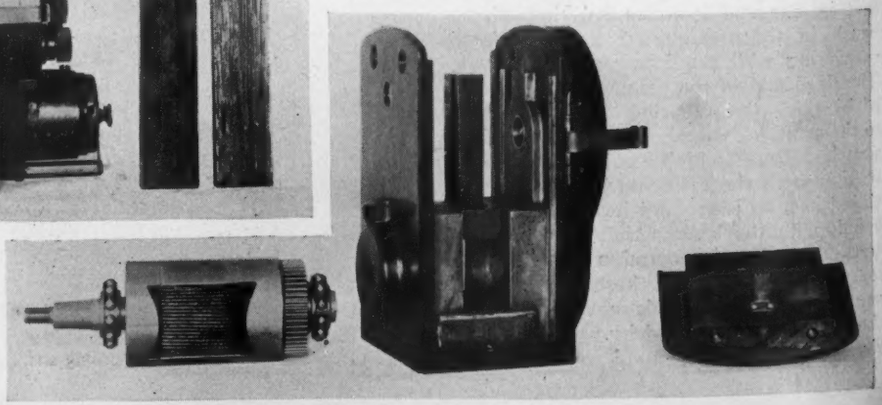


Depicting the Four Straight Magnets, Bars and Plates Removed From Housing and the High-Tension Winding Which is Mounted on a Fixed Core.

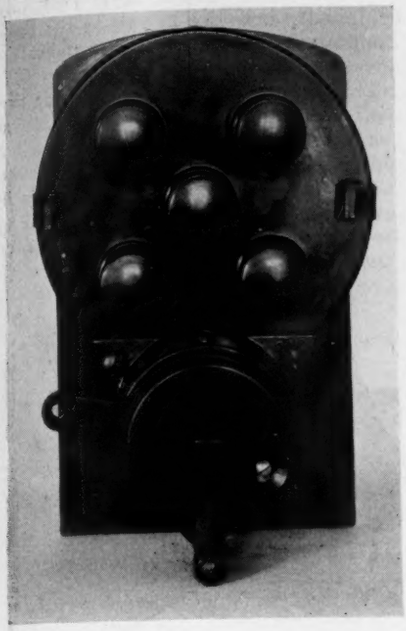
The interruption of primary occurs with armature in position illustrated. Note the method of collecting the induced current from the h. t. winding.

The Housing is a Unique Die Casting of Alloy Aluminum and the Laminated Pole Pieces Are Cast With It

Tubes cast in housing supply lubricant and provision is made for draining excess oil. Note one-half of the safety spark cap on bonnet. The other half is on the contact ring of h. t. winding.



and practical tests. The effort of the engineering department has been directed toward producing a high grade, depend-

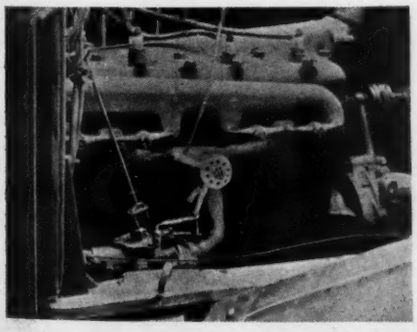


Side-View Showing the Removable Side Plates and Bonnet Uniting the Straight Magnet Bars at the Top

able magneto, one requiring the minimum of attention and capable of being serviced without trained electricians.

New Gasoline Saving Device

A new device planned to assist the carburetor in creating a more perfect mixture under all climatic conditions and also to regulate the proper proportion of mixture best suited for the varying grades of road over which the truck is traveling, was presented to the trade for the first time at the Show by the Vaporizer Utilities Sales Corp., 2255 Broadway, New York City. It is known as the Sav-o-gas Economizer and is said to save about 25 per cent. of gasoline.



The Savogas is Attached to the Manifold

With it the necessary changes of the mixture relative to the grades of road traveled are almost automatically adjusted with this device. It can be attached to any engine without alterations. It is attached to the manifold and operated by either foot accelerator or hand throttle. A pull on the knob on the dash board within easy reach of the person on the seat, brings the economizer into operation.

The Heavy-Duty Pittsburgh Tractor Engine

In the Pittsburgh booth was displayed a four-cylinder heavy duty tractor engine type E B A. It is manufactured by the Pittsburgh Model Engine Co., Pittsburgh, Pa.

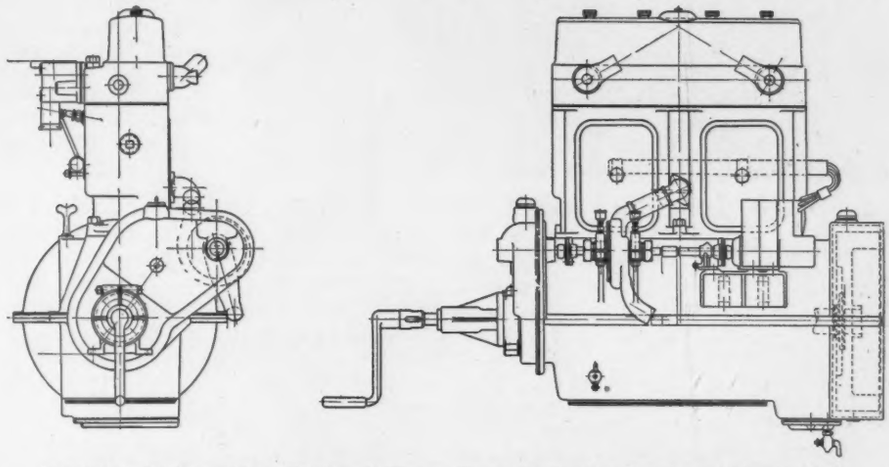
The four cylinders are vertical, cast in block with a bore and stroke of 4½ in. and 6 in., respectively. The cylinder head is cast separately and is securely fastened to the cylinder block with ten heavy through studs. The suspension of this engine is of the three-point type, incorporating a single trunnion bearing on the front cast iron cover and arms at the rear end of the bell housing.

The water jacketing provides ample water capacity. The inlet and exhaust valves are located in the cylinder head and actuated from the crankcase camshaft by vertical push rods and overhead rocker rods. Long removable valve guides are pressed into the cylinder head. The grey iron pistons are accurately ground to size, with the ring lands above the piston ground, slightly smaller in diameter and tapering toward the head to allow for unequal expansion. Each piston is fitted with three rings and one oil groove above the piston pin and one oil wiper ring and one oil groove below the piston head. The piston pin is of hollow steel held into position by a lock screw, tapped into the piston pin boss. Lock screw secured by special washer.

The connecting rods are I-beam section, dropped forged from S. A. E. specifications, carbon steel heat treated, and fitted with babbitt lined bearings on the crankshaft end and bronze bushing on the piston pin end. The bearings at both ends are extra long and of large diameter, the larger end being adjustable by brass laminated shims. The crankshaft is dropped forged from carbon steel, heat treated. Oil holes are drilled from the main bearings through the cheeks to the crank pins to furnish lubrication to the big ends of the connecting rods. The flywheel flange is forged integral with the crankshaft. The camshaft is also dropped forged from carbon steel and has cams forged integral with the shaft. Thrust wear is taken up by a spring plunger at the forward of the camshaft. The camshaft gear is bolted directly to a flange cast integral with the camshaft.

The mushroom type valve lifters are of hardened steel. Inlet valves are of chrome nickel and exhaust valves of tungsten steel. The valve guides are cast iron, pressed in the cylinder heads.

The grey iron crankcase is rigid, being reinforced by cross ribs and webs. All gears are encased in an oil tight compartment at the forward end of the crankcase, access to which may be obtained by removing the front cover. The oil pan is of cast iron and contains an oil reservoir and a pump. Timing gears are cast iron helical cut.



Mechanical View of the Pittsburgh Heavy-Duty Engine for Truck and Tractor Jobs

Oil is pumped by a gear pump, which is driven by bevel gears from the camshaft, and distributed through the drilled holes in the crankshaft and the connecting rods to the various bearings. The camshaft is also lubricated by special feed. A relief valve is provided in a circulation system to maintain a constant pressure of oil. A high level drain oil cock is provided.

A centrifugal water pump attached to the crankcase by two heavy trunnion bearing brackets and which is of ample capacity, is provided. The entire circulating system is drained by opening a drain cock on the water pump body. Cooling is further assisted by a fan, if desired. It is actuated by a drive pulley, that is furnished if the fan is desired, mounted on the front end of the water pump and magneto drive shaft.

The exhaust manifold is cast integral of cast iron and is fastened by studs. This design manifold tends to create a more combustible mixture.

The magneto is driven off of the rear end of the pump shaft. Both water pump and magneto are placed opposite the in-

let and exhaust manifold side, making them accessible.

The following electrical units are optional and any one of these groups can be supplied completely installed:

a. Straight magneto.

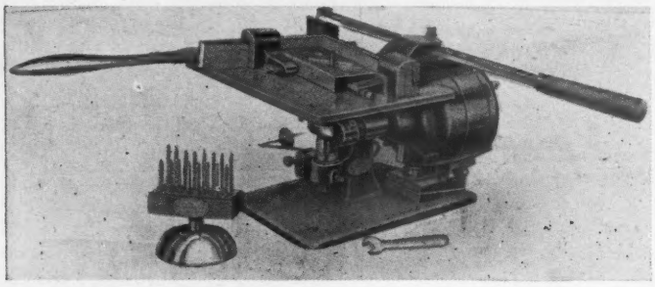
b. Atwater-Kent or similar distributor, and Westinghouse generator and starting motor.

c. Westinghouse generator, distributor and starting motor.

d. Delco system.

The Anderson Die Forming Machines and Cutters

The Anderson die forming machine exhibited at the Show by the Anderson Die Machine Co., Bridgeport, Conn., is designed to perform such work on blanking dies and similar work as heretofore has been customary to do on a filing machine.



Bench Type Anderson Die Machine No. 11

With the universal pivoted lever feeding device the cutter can be approached from any direction.

Some of the advantages claimed to be secured by the use of this machine are the following: The work is drawn on the table or platen, this is brought about by the super-helical cutters; a wide range of surface contours finished without change of cutters; surfaces finished with uniform degree of clearance regardless of direction from which work is applied to the cutter; chips are carried downward and are not deposited on the top of the die to obscure the pattern or layout; increases the speed of work, and the die need not be touched by the hand of the operator.

A table, 8 in. square, is pivotedly mounted on a frame. This has a bracket or extension to which is secured a lever. This lever can be adjusted toward the rear of the machine. Pivoted to this lever is an arm or fixture to which two dogs or clamps can be secured and adjusted, so as to hold a die rigidly to the arm. The pivot connection is in the form of a tapered plug which will fit any of a series of holes in the lever, to suit the location of the opening in the die.

In order to secure proper and uniform clearance on all sides of the die, the cutter is made to taper, the degree of such taper on each side of the cutter being the same as the desired degree of clearance in the die. The table is adjusted at right angles to the axis of the cutters, so that the taper will be reproduced on the work in hand, no matter from what direction the cutter is approached.

The regular equipment consists of machine equipped with 110 or 220 volt A C 60 cycle single phase or 110 or 220 D C motor having flexible cord, attachment plug and switch, portable tool rack, one set of 12 cutters, pivoted universal feed lever and necessary wrenches.

The following are specifications of the Anderson die forming machine No. 11: Capacity, 1-16 to 5-16 diameter cutters; will finish dies up to 1½ in. thick; working surface of table, 8 in. square; height from bench over all, 12 in.; main spindle, made from chrome nickel steel, hardened and ground; main spindle bearing, S. K. F. radial ball bearing; chuck, maximum capacity ¼ in. draw back. Bench type: Weight with motor 2, 85 lb.; weight boxed for domestic shipment, 125 lb.; size of outside of box, 21 in. x 16 in. x 28 in.; cubic feet boxed for foreign shipment, 5½ cu. ft.; weight boxed for foreign shipment, 135 lb. Pedestal type: Weight with motor and pedestal, 290 lb.; weight boxed for domestic shipment, 335 lb.; size of outside of box, 54 in. x 24 in. x 22in.; cubic feet boxed for foreign shipment, 26½ cu. ft; weight boxed for foreign shipment, 350 lb.

Peters' Crankshaft Grinder

The exhibit of the Aluminum Brazing Solder Co., 1303 Widener Bldg., Philadelphia, Pa., was featured by the Peter's Crankshaft Grinder, a device designed to facilitate rebabbitting of bearings.

It is made of aluminum and high speed steel and is claimed to withstand years of heavy service. It consists of eight silver steel cutters that work universally toward the center. The cutters extend far enough to prevent chips from clogging and scratching the surface of the pin. All the cutters are moved to and from the center universally by a screw plate which is operated by a spanner wrench. This device is adjustable to any size automobile crankshaft. Perfect alignment is assured by a tapered locking pin. This tool is split and hinged at one end to allow placement for removal on and from the pin. The price is $75.



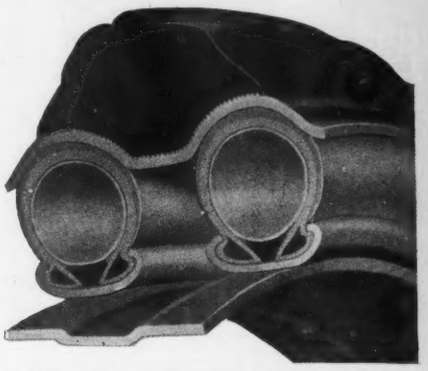
Peters' Hand Crankshaft Grinding Tool

This tool is split and hinged at one end to allow placement on crankshaft pin

A New Puncture Proof Tire

The Eagle Puncture Proof Tire Co., Inc., 1662-64 Broadway, New York City, exhibited a new tire known as the Eagle Puncture Proof Tire. It is a radical innovation of pneumatics.

This tire combines two pneumatic tires with individual inner tubes and a larger heavy resilient outer tire of solid rubber, separated by a steel rim which eliminates the common pneumatic tire troubles by protecting the two inner tubes against punctures and blowouts with a sheet steel rim.



Sectional View of Eagle Puncture-Proof Tire

Note sheet steel rim separating tubes from the heavy rubber tread

All the resiliency of a pneumatic is claimed to be secured by this combination of a heavy solid rubber tread, sheet steel rim and pneumatic inner tubes. These tires are demountable and are made in standard sizes.

New Compressor for Inflating Giant Tires

The new portable air compressor of the giant two-stage type, recently described in detail in the November issue of the COMMERCIAL CAR JOURNAL, page 64, manufactured by the United States Air Compressor Co., Cleveland, Ohio, and known as the Usaco was exhibited at the New York Truck Show.

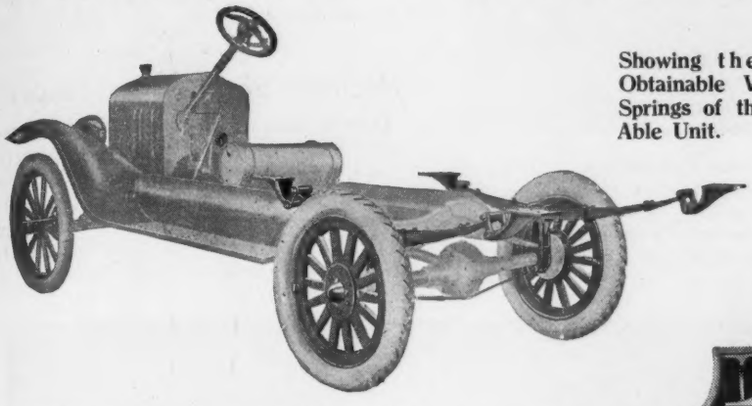
This unit is particularly adapted for the inflation of heavy truck tires. It is also portable and can be moved about with ease.

The International Harvester Co., Chicago, displayed their 1500 lb. chassis with screened express body; a 1½-ton stake body job, a 2-ton and 3½-ton chassis. The exhibit also included a panel display of parts.

The Af-Ford-Able Junior Truck Unit

A new outfit for transforming a Ford car to a truck has been announced by the Affordable Motor Truck Corp., 1154 N. 16th St., Omaha, Nebr. This new unit is known as the Af-Ford-Able Junior Truck Unit and does not materially change any of the Ford mechanism. It is attachable to a new or old Ford and sells at $97.50 f.o.b. Omaha.

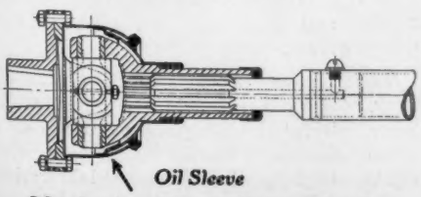
All the castings of this outfit are made of electric cast steel and malleable iron. The spring links and spring clips are drop-forged steel. A feature of the outfit is the wheels and wheel bearings. The wheels have square spokes with demountable rims and heavy brake drums. The wheels are fitted with hubs ready for mounting and the rims will fit either the 30 x 3½ standard Ford tires or the 31 x 4 oversize. The wheel bearings are extra large and strong and are placed inside the Affordable heavy hub and rotate outside the rear axle housing. Thus the strain is taken from the set of Ford bearings and the Ford axle shaft. In this way a floating axle construction is secured. An axle brace is furnished, made of high grade steel, in the form of a rod, fitted with a turn buckle which is tightened when installed. This brace is fastened to the spring perch castings and helps retaining the axle in perfect shape. The springs furnished with the outfit are 44 x 2 in. The weight, boxed for shipment, is 200 lb.



Showing the Overhang Obtainable With the Springs of the Af-Ford-Able Unit.

A New Merchant & Evans Oil Lubricated Universal Joint

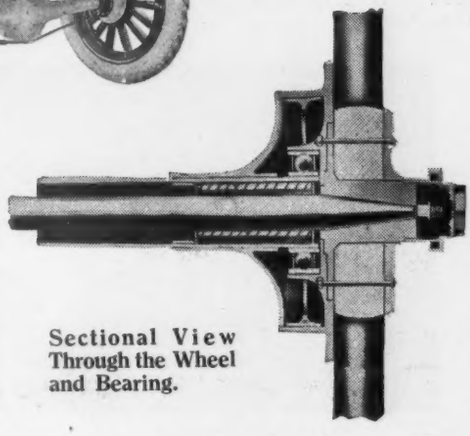
A new oil lubricated universal joint claimed to run 30,000 car miles without change or loss of oil or injury to packing, has been recently announced and exhibited at the New York Show by the Merchant & Evans Co., 2013-35 Washington Ave., Philadelphia, Pa.



Merchant and Evans Universal Joint
This joint is provided with an oil-tight housing

The working parts consist of two hardened pins accurately ground, the four ends of which are inserted in four hardened and ground bushings, which are driven into two tough steel drop forgings, a block being inserted between the yokes of these forgings for centering and supporting the pins.

Ample bearing surfaces of the bearing materials have been designed so that the pressure per sq. in. would be as small as possible. This tends to increase the life of the joint. The housing is dust-proof and at the same time acts as an oil-tight casing to hold the oil around the working parts. The inside leather sleeves, washers and anti-dirt hemp packing not only retain the oil but also bring the oil in direct contact with the various moving parts. The oil is admitted into the inner mechanism through a passage bored in one end of the shaft which registers with another boring that runs down at right angles from the outside surface of the shaft. After the lubricant has been admitted a plug is inserted into the opening, thereby closing the only possible means through which oil couldescape.



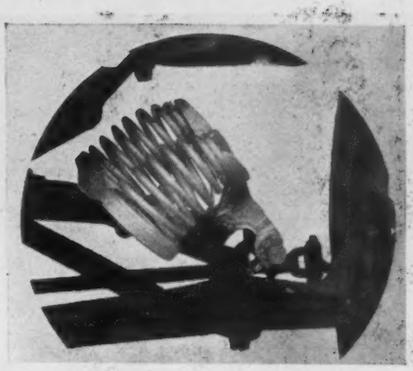
Sectional View Through the Wheel and Bearing.

This universal joint is made in four sizes to fit all conditions of work. The standard shaft connections are the S. A. E. Standard 10 Sq. and of various sizes, according to the size of the joint.

New Hassler Shock Absorber

The display in the booth of the Robert H. Hassler, Inc., Indianapolis, Ind., included in its large line of shock absorbers a new type absorber constructed along the same lines as all other Hassler shock absorbers.

It prevents all rebound and up-throw and a stop on the shock absorber engages and holds a lever stationary at the time of rebound. The spiral springs are again immediately compressed and the regular springs are held down. This action with the angle of the spiral springs holds the body central with the chassis and prevents side-sway.



New Twin-Type Hassler Shock Absorber

The spiral conical springs are made of chrome vanadium steel. The load of the car compresses the springs so that the slightest jolt may give easily.

This absorber is made extra heavy for commercial cars. When overloading is usual an additional leaf is provided to be inserted in the front spring.

This twin type absorber is said to cause a saving of gasoline, reduction of up-keep and tire expense.

New Wellman-Seaver-Morgan Engine Initiated at the Show

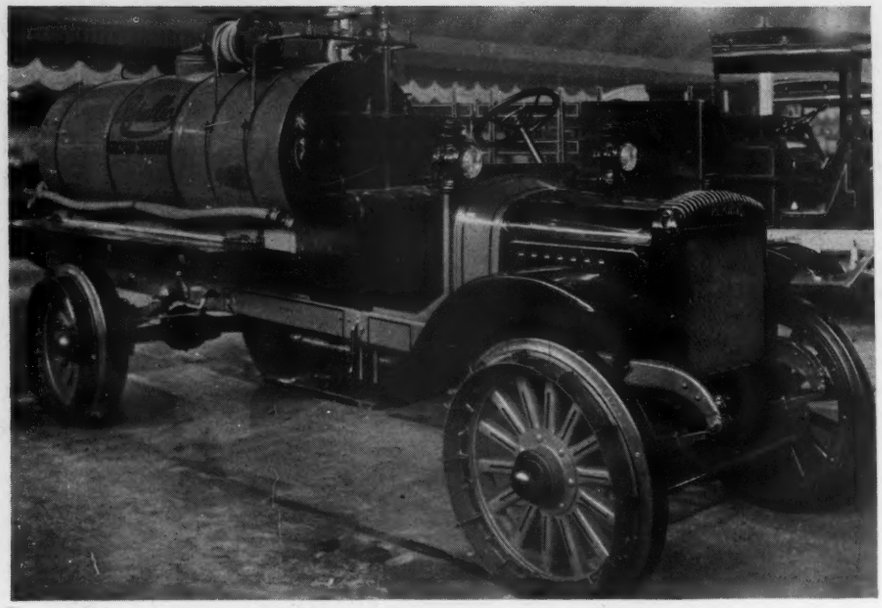
A new heavy duty engine for either truck or tractor service was exhibited for the first time at the Show by the motor division of the Wellman-Seaver-Morgan Co., Akron, Ohio.

Primarily the new W. S. M. is a valve-in-head four-cylinder engine of low speed, heavy duty, and operating at 1000-1100 r.p.m. No chains or belts are employed in its mechanism-fan, water pump, oil pump, starter, etc., are operated by gears which run in oil. An innovation is the removable cylinders. Its lubrication system forces oil under regulated pressure to all moving parts of the motor. Its cooling system is operated by a centrifugal water pump which provides ample cooling under all conditions. Because of its hot spot, ram's-horn manifold, overhead valves, the engine operates readily on gasoline, kerosene, distillate, petrol or paraffine. Large handhole plates provide accessibility to crankshaft and connecting rod bearings, etc. Starter, generator, water pump and other detachable parts can be easily removed.

A more detailed description will be published in a later issue of the COMMERCIAL CAR JOURNAL.

Oneida Display Notable for Finish

One of the distinguishing features of the exhibit of the Oneida Motor Truck Co., Green Bay, Wis., was that all of the models were painted the same color, an attractive red, and the finish was high grade throughout, indicating the trend towards better painting. The models shown comprised the 1¼-, 1¾-, 3½- and 5-ton chassis and the use of electric lighting was noticeable. In addition the exhibit included an engine.



The Republic Orchard Sprayer on a Two and a Half Ton Chassis

One of the attractions at the Republic exhibit. The specifications include Foley traction rims; 600 gallon tank; Northern rotary pump; Fuller power take-off; 100 feet of hose; reels, etc. A feature of this outfit is a body-removing device which permits the body to be removed in a few minutes and only requires the services of one man. This feature should prove of special interest to the farmer as it permits him to use any other kind of body on the same chassis.

Maxwell Body Line Complete

In addition to what is termed in passenger show parlance, a show chassis, a cutaway engine and operated by an electric engine to exhibit the moving parts, the line of Maxwell trucks included four body styles and one of these was a contractor's body. The other body styles were conventional types but all were highly finished and the display was very attractively arranged.

Standard New One-Ton Job

The Standard Motor Truck Co., of Detroit, showed the new one-ton model, which was described in our October issue, page 45. A 3½-ton platform stake job was also exhibited.

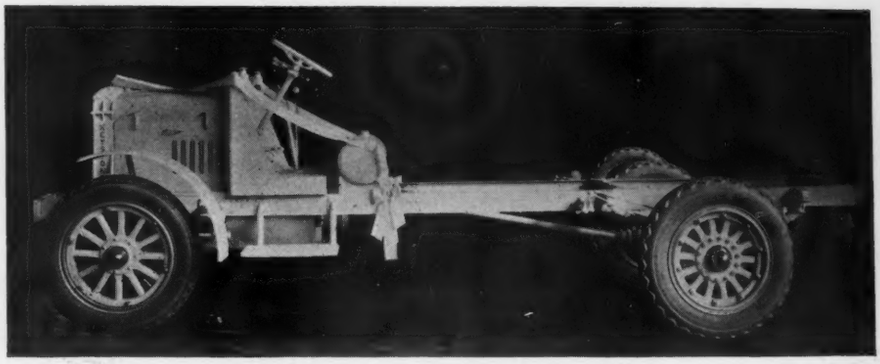
Huffman Showed One Model

Two models of the same carrying capacity but of different construction were shown. The Model B truck of 1½-2-ton capacity has a worm drive rear, a Continental engine and pneumatic tires. The Model C has an internal gear drive rear, a Buda engine and has solid tires.

Reo Speed Wagon With Many Bodies

The Reo Motor Car Co., of Lansing, Mich., exhibited a complete line of body jobs including a dump body with hand hoist, stake body, ambulance, combination pump and chemical outfit, station wagon, 16-passenger bus job, hearse, panel, side delivery job, etc. All these bodies were mounted on the Reo speed wagon chassis.

Garford Motor Truck Co., Lima, Ohio, showed 1¼- and 2½-ton models, and a 5-ton model, chain drive. The 1¼-ton chassis, Model No. 25, was described in the September issue on page 67.



The New Keystone Two-Ton Truck

This model shown by the Commercial Car Unit Company, of Philadelphia, Pennsylvania, was one of the few models done in white



The New Traylor Truck Made in Four Capacities

The Traylor truck, built by the Traylor Engineering and Manufacturing Company of Cornwells, Pennsylvania, was publicly shown for the first time during show week, on the 7th floor of the Grand Central Palace. This truck will be described in detail in our February issue.

The Transport Truck Co., Mt. Pleasant, Mich., exhibited its complete line, including a 1-ton, 1½-ton and 2-ton chassis. The feature is the use of the Alemite lubricating system, power tire pump, method of mounting the license plate on the front left fender, hot spot manifold. Company announces fact that a 3½-ton model will be in production soon.

The Winther Motor Truck Co., Kenosha, Wis., exhibited a 4-ton rear drive job mounted on solid tires fitted with Clark internal gear axle. The 1½-ton four-wheel drive job with pneumatics, was also shown. This company's complete line, although not on the floor, includes gear driven models from 1½- to 7-tons, and 1½-, 2½- and 3½-ton four-wheel drives.

The Union Motor Truck Co., Bay City, Mich., exhibited a 2½-ton stake body job fitted with power hoist, also a 4-ton chassis. These trucks are also equipped with the Alemite lubricating system. Emergency brake on the rear in back of the universal is a feature.

American Chain Products

The booth of the American Chain Co., Inc., Bridgeport, Conn., was conspicuous in its extensive display of chain products. Included in this company's line were two new products recently offered to the trade, the Acco Automobile Sling Chains and pneumatic truck tire chains.

The Acco Sling Chains are used to lift engines and transmissions from the chassis, raise a front or rear end, when replacing springs or removing axles, or any other odd jobs of heavy lifting. The Acco chains are general utility chains as well. They can be used as emergency



The Acco Sling Chain

This chain can be utilized to advantage for lifting engines, transmissions from the chassis, and for towing.

towing chains and binding chains and for other similar uses for which the grab hooks make them convenient. These grab hooks make possible quick and easy adjustments, as they can be hooked at any point on the chain. They are made in two sizes, one tested for a breaking strain of 5000 lb. and the other of 3000 lb. Length of each branch overall is 5½ ft. and 9 2-3 ft., approximate weight, 8¼ lb. and 21 lb.; price $2 and $4.50 for the 3000 lb. and 5000 lb. sizes, respectively.



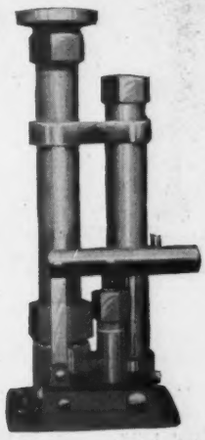
Weed Anti-skid Chains

View of chains attached. Lower view shows the cross chain which is of special steel stock

The Weed chains for pneumatic truck tires are an effective traction and anti-skid device for pneumatics. They are made especially strong and so constructed that they satisfactorily meet the requirements of heavy truck service. The side chain is made of heavy wire of high tensile strength and the cross chains are made of special stock. The feature of constantly creeping backwards around the tire prevents them from coming into contact with the tread at the same place at any two revolutions of the wheel. They are made in sizes of from 4½ in. to 10 in.

Jaxall New Hydraulic Auto Jack

The exhibit of the Sunderman Corp., of Newburgh, N. Y., was featured by a new hydraulic auto jack, known as the Jaxall and presented to the trade for the first time at the New York Show.



New Jaxall is a Departure From the Standard Jack

This company realizing the indispensibility of a jack to be included as standard truck equipment, in view of the growing use of pneumatic tires, decided that a unit of this description would be invaluable to truck owners.

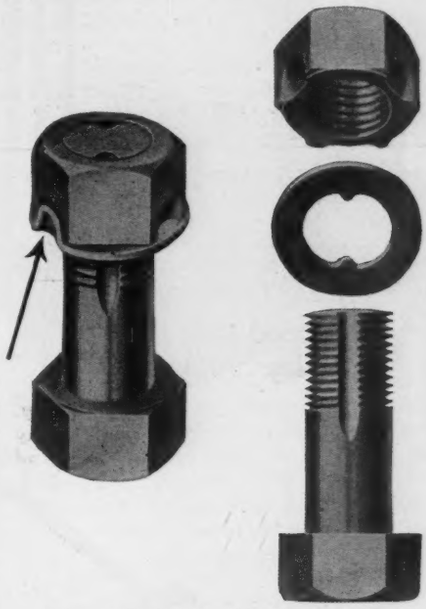
This jack is operated by a few up and down motions of the handle which pumps the oil from one cylinder into the other, thus raising the jack-head by hydraulic power. It also checks itself when the truck is at the required distance above the ground. To lower truck, it is only necessary to pull the release lever and the weight of the truck slowly expels the oil, lowering the truck. As this jack is built on the hydraulic principle, no gears and ratchets are involved.

The materials used in the construction of this jack are said to be of the best quality, brass and steel being used throughout. It is compact and neat and is said to raise and lower a truck with speed, safety and convenience.

It is built in three sizes: No. 1, 2 and 3 for all type passenger cars, 3- and 5-ton trucks (loaded), and 5-and 10-ton trucks (loaded), respectively.

Stevenson Safety Nut and Bolt

A safety interlocking nut and bolt known as the Stevenson was the feature of the Safety Nut & Bolt Co.'s exhibit. With this bolt and nut all the elements are brought together in perfect contact and locked there without a possibility of motion in any direction.



Stevenson Interlocking Nut and Bolt

Section of washer upset, into chuck of nut, indicated by arrow, prevents the nut from unscrewing.

The Stevenson device is radically different from anything ever invented for the purpose for which it is intended. It is a combination of an ordinary bolt with tapered grooves on opposite sides, over which is placed a washer with two inner extending lugs that fit tightly into the grooves in the bolt, preventing any lateral motion. The nut has a chuck on each side of its outer edges. When it is carried home to perfect contact with the washer, a portion of the washer is driven into one or more of the chucks with an upsetting chisel. This completes the lock. One blow of a hammer locks the washer to the nut and one blow unlocks it. The washer may be used several times.

The Safety Nut & Bolt Co. is located at 1839 Euclid Ave., Cleveland, Ohio.

Sanford Line Attractive

While the Sanford Motor Truck Co., Syracuse, N. Y., exhibited but two of its three models manufactured, the exhibit was noticeable for the location of the chassis. These were arranged to attract the visitor who was enabled to view both on all sides easily and without discomfort.

Mead-Morrison Cranes and Winches

The Mead-Morrison Mfg. Co., East Boston, Mass., exhibited a very attractive and interesting display of cranes and winches and other apparatus to be used in connection with the truck.



Below: Horizontal Winch Equipped With a Weight for Demonstrating Purposes.

Above: Two and a Half Ton Winch to be Installed Immediately Behind Seat of Chassis.

This line included a horizontal 1-ton winch on side of chassis, a vertical 1-ton winch on the floor of the chassis, a vertical 2½-ton winch to be installed immediately behind the seat of the chassis. A horizontal drum winch equipped with a weight to demonstrate the action of a patented automatic brake and one lever control. A four speed oil field and telephone winch of 6-tons capacity, and a 1-ton crane provided with a power winch and an electric winch.

Easton Presents New A. B. Universal Joint

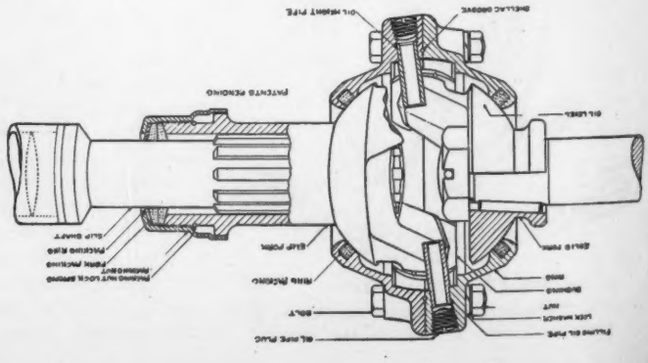
The Easton Machine Co., South Easton, Massachusetts, exhibited a new universal known as the A. B. Universal Joint and which is claimed to have perfect lubrication at all times.

This universal joint consists of eight essential parts; four bushings, two rings or ring housings, and two forks or yolks, which are interchangeable respectively. The ring housings and forks are dropped forgings and the bushings are of alloy steel. All bearing surfaces are heat treated, hardened and ground to withstand high bearing pressure. The construction of the bearings which hold the forks make possible a constantly lubricated bushing. Grooves on the face of the bushing admit the oil. It centers under centrifugal force and has an opportunity to perform its duty at the points where all the pressure takes place.

A heavy felt washer between the ring and the fork on the spherical surfaces acts as a dust ring. The two ring housings, held together by eight heavy bolts, are hermetically sealed by a heavy coat of shellac on the matched faces of the two ring housings, which holds securely on account of a matched annular groove on these faces. This sealing keeps foreign matter from entering and oil from escaping.

The packing nut assembly on this universal embodies a positive spring lock which prevents the nut from working loose. Tightening this nut causes the packings to fit the slip shaft more closely, thereby preventing either entering of foreign matter or leakage of oil.

These joints are made in several sizes embodying the same design and method of lubrication.



This Sectional View Gives a Comprehensive Conception of How This Joint is Assembled.

New Superglobe Compressor

Globe Manufacturing Co., 64 Grant St., Battle Creek, Mich., featured their display by a new compressor, known as the Superglobe type F T O stage compressor.

This compressor contains but one cylinder, one piston, and one connecting rod and as it is very light in construction, it may be driven at an unusually high speed and is therefore capable of developing a correspondingly greater capacity. Ball bearings are renewable and of generous proportions, having metal shims with ample provision for adjustment to take up wear. The piston end of the connecting rod has a renewable bronze bearing, with take-up working on hard bed steel piston pin. All of the bearings are bronze backed with hard babbitt linings.

By removing the crankcase cover, which merely serves to enclose oil working parts, access to the bearings is afforded.

Lubrication is automatic throughout by controlled splash. An oil reservoir with sufficient capacity for six month's operation and convenient means for filling and draining, is another feature of this compressor. It is also provided with an oil level gage.

The compressor starts with no compression, on account of the action of the automatic unloader, which also automatically drains condensing chamber.

The following list prices are for complete Superglobe equipment with 50-gal. (16 in. x 60 in.) tank for 200 lb. pressure:

Motor, 1½hp.; speed of compressor, 208 r.p.m.; capacity, 6 cu. ft. per min.; list price $525

Motor, 2 hp.; speed of compressor, 275 r.p.m.; capacity, 8 cu. ft. per min.; list price $575

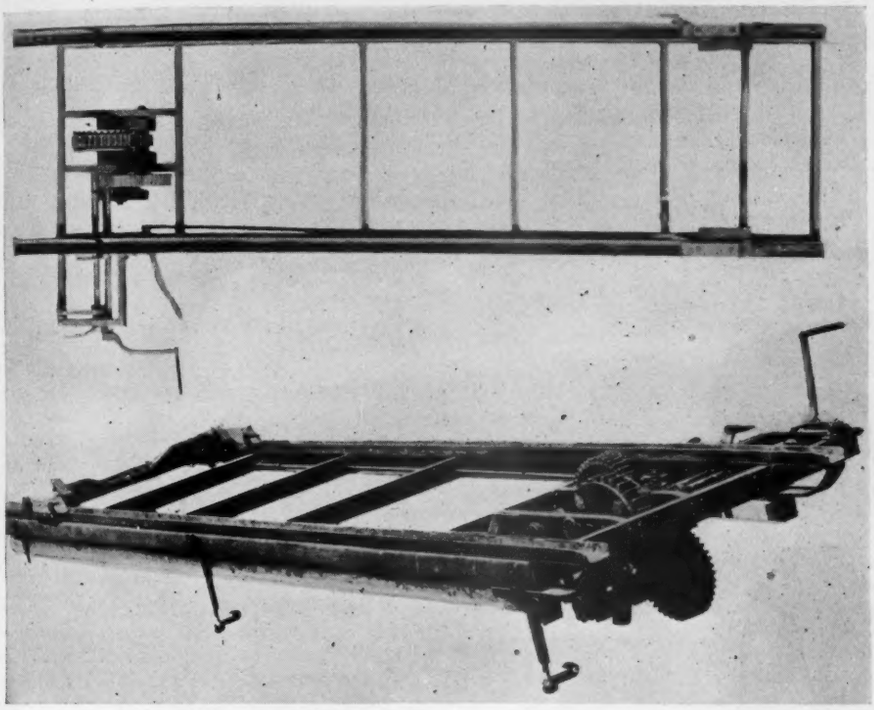
Motor, 3 hp.; speed of compressor, 350 r.p.m.; capacity, 10 cu. ft. per min.; list price $650

Above prices f.o.b. Battle Creek, Mich.

The Jackson Automobile Co., Jackson, Mich., which company builds the Jackson four-wheel drive truck, exhibited a 3½-ton chassis, also the same capacity chassis fitted with a stake body job.

New Roll-Off Body on Four-Drive Chassis

A demountable body of the roll-off type was the feature of the exhibit of the Four Wheel Drive Auto Co., Clintonville, Wis. This was on a 3-ton chassis which carries channel sections on the frame and in which the wheels of the demountable body fit. The bottom of the body has a rack centrally located and parallel to the length of the body and a pinion mounted at the rear cross member of the frame moves the body forward or backward. The pinion is manually operated with proper gear reduction, and stops at the forward end of the chassis limit the movement of the body. Suitable means are provided for preventing movement of the body when the truck is in transit. This design permits shuttling of the truck, the use of two or more bodies to reduce time and eliminates idle time. Five other models were displayed, these including winch and power take-off, hoist, dump, stake, etc.



Above: Showing the Channel Sections and Frame of Demountable Body, Method of Attaching Carrier to Chassis Frame and a Plan View of Pinion Gears and Operating Lever

Below: Illustrating the Rack and Wheels on the Bottom of the Demountable Body of the Four-Wheel-Drive Auto Company

New Full-Floating, Oil-Tight Flint Axle

A new 1½-ton truck axle has been recently developed by the Flint Motor Axle Company, Flint, Mich., and is now being manufactured on a large quantity basis at the Flint factory.

The Flint axle is a double-reduction drive with one reduction at the axle differential and the other at the outside of each wheel, where there is one ring gear and three pinions equally spaced so as to balance the drive and reduce the size of the gears required.

Power is transmitted through this axle in a simple manner. On the outer end of the main shaft, which is light in weight and made of chrome nickel steel, is a gear pinion that meshes with three planet pinions, which, in turn, mesh with the ring gear. When the differential rotates in a forward direction it drives the pinions at the outer ends of the main shafts, which in turn rotate the planet or idler gears. The planet gears use the ring gear as a support. The ring gear does not move. It simply allows the planet gears, which are studded to the driving flange, to be rotated about these studs, which are thereby revolved about the axis of the main shaft. Even with this second gear reduction all parts move in a forward direction. The construction of the axle is full-floating and the jack or main shaft is the driving member. The housing which covers the shafts is the load carrying member. This housing is either made of malleable iron in a built-up form, a steel casting, or a one-piece pressed steel housing. The axle is symmetrical and evenly balanced. Both main shafts are identical in design, having the same spline at either end in order to prevent an inaccuracy when assembling.

The bevel gears in this axle are easily adjusted. The gears on the outer ends are of the spur type and therefore do not need adjusting. The axle is equipped with roller bearings, separating the radial load from the thrust. Spring centers are located as near the wheels as possible thereby placing the fulcrum of the load-carrying member where the least leverage can be obtained. Other main features of the axle are:

Wheel bearings, ring gears and three planet pinions on each wheel run in a bath of oil, the housing being oil-tight and road-dust proof.

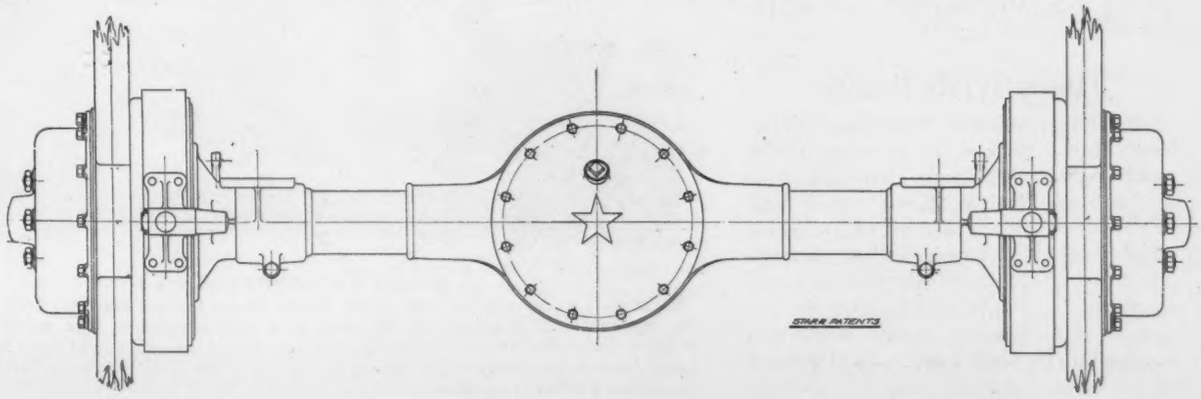
The Flint Drive is a truck axle that is really full-floating, with all parts accessible. All gears may be replaced without raising the truck or removing the wheels.

Road clearance of 13 in. for 1½-ton truck.

The manufacturers are designing a complete line of truck axles, built upon the principles embodied in the 1 to 1½-ton type.

Stewart Line of Five Sizes

The Stewart Motor Corp., of Buffalo, exhibited its complete line of five sizes ranging from ¾ to 3½ tons including a 20-passenger bus. The bus body was mounted on a Model 9, 1½-ton chassis.



This Full-Floating Flint Axle Has a Reduction at the Differential and at the Outside of Each Wheel.

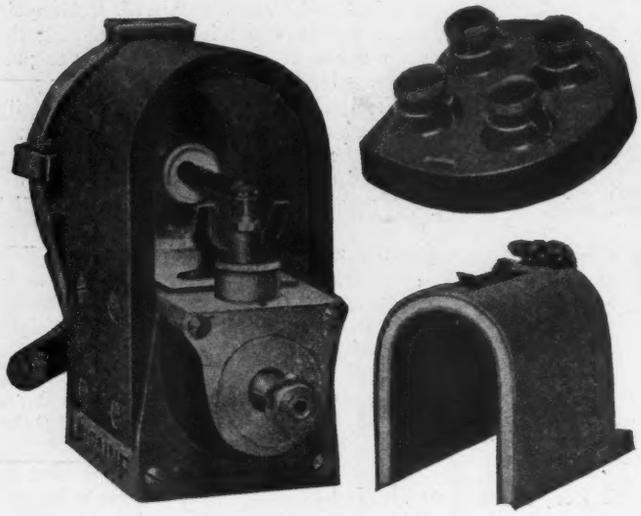
Lauraine Magneto

The products of the Menominee Electric Products, Inc., 1251 S. Michigan Ave., Chicago, Ill., were prominently displayed in its booth. The articles included in the display were the Lauraine Magneto and the Lauraine Generator.

The Lauraine magneto is made in all standard sizes and is of the Siemens armature type, independent high tension. The feature of this magneto is the waterproof cover, which can be easily removed, making the parts which were covered accessible. The breaker housing is supplied with two arms—permitting the machine to be linked up from either side. Contraction or expansion from excessive temperature or moisture of the breaker arm bearing, is said to be prevented, as it is built up of cross section fibre, working on a pin which is integral with the main breaker block. All castings bases and end plates are made of bronze. The cam is a cross section of steel tubing which is shaped, hardened and ground to size. High tension parts are of hard rubber. By means of a small window in the water proofing cover, the spark at the safety gap is visible.

The distributor gear is adjustable for wear through eccentric cushions which permits of quiet operation. This magneto is built in six sizes ranging from $30 to $80 in price.

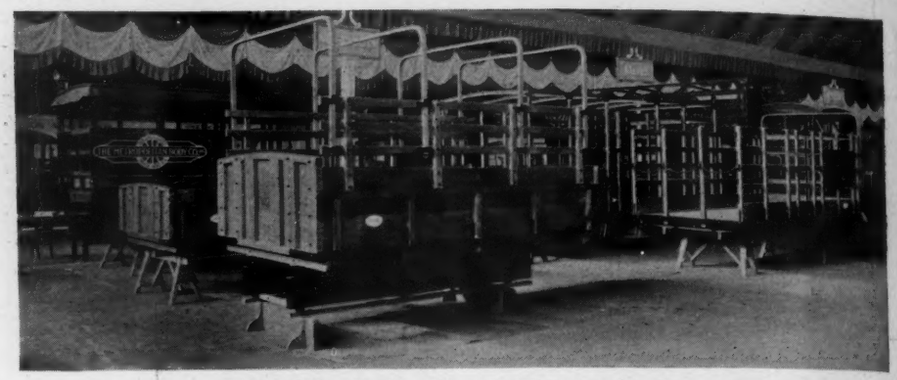
A new impulse starter, still in the process of manufacture, will be announced shortly by this company and will be described in detail in a later issue of the COMMERCIAL CAR JOURNAL.



Lauraine Magneto With the Cover and End Plate Removed, Exposing the Internal Mechanism.

Huron White Bronze

The Baush Machine Tool Co., Springfield, Mass., showed in addition to its usual exhibit of worms and gears for automobile axles, a 2½-ton truck rear axle made of Huron white bronze, which weighs about as much as an ordinary pleasure car axle and still possesses ample strength. A gas engine with the exception of the ignition points, crankshaft and piston rings exhibited, was also made of this metal.



Metropolitan Bodies Were Exhibited in Number
This company showed some of its advance styles, production on which will start in June, 1920

The company is represented by specialists in worm gearing, using in its parts Huron sheet metal, forging metal and casting metal.

The Denby Motor Truck Co., Detroit, Mich., exhibited a 2-ton job with stake body, done in white with black striping, which job made a very attractive appearance. A 2½-ton chassis and a 4-ton job having a capacity of 5 yards and fitted with hydraulic hoist, completed the display.

Timken Axle Plans Expansion

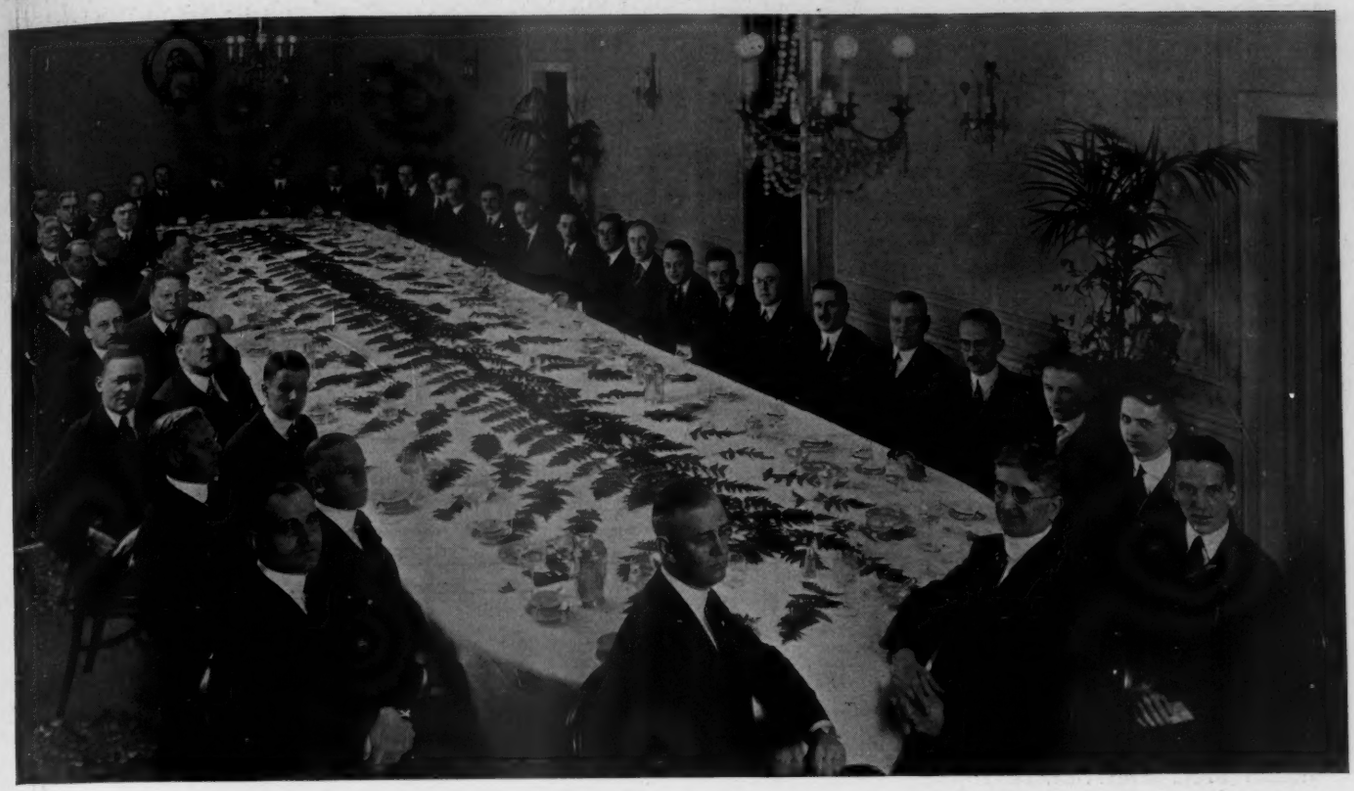
DETROIT, MICH.—The increase in capitalization recently authorized by the Timken-Detroit Axle Co. was made for the purpose of taking care of the increased demand for the axles manufactured by the company. The company is planning a large expansion for 1920 which will enable them to increase their annual production of 255,000 sets of axles to 400,000 sets in 1921.

A few important changes have been made in the personnel of the company, including the resignation of W. R. Timken as president. He continues to serve in the capacity of director.

Franklin Automobile Company, Syracuse, N. Y., announces that it will hold a dealers' conference on Wednesday, January 28, in connection with the Chicago Show. The conference, which will begin at 10 A. M., will be held at the Congress Hotel and will be followed by a luncheon at 1 o'clock.



Rainier Worm-Drive Delivery Truck
This delivery truck, manufactured by the Rainier Motor Corporation, New York City, embraces all the improved units of construction necessary for a truck designed for light, quick work. An enlargement of the factory and its increased facilities has enabled the company to better fulfil the amazingly large domestic and foreign orders coming in. Many of the good features of this truck were demonstrated at the New York Show.



Chilton Conference Which Was Held at the Biltmore Hotel During New York Show Week

Part of the Chilton Company's Annual Conference was held during the first four days of the New York Show. Breakfast was served every morning at the Biltmore. Plans were outlined at these gatherings for the purpose of increasing the value of Chilton Publications to their readers

Fuel Problems and Tendencies in Engine Design Discussed by Engineers

S. A. E. Moves at a Rapid Pace During Show Week, Attending Sessions and Banquets

NEW YORK, Jan. 7.—Among the activities of the week was the annual meeting and professional sessions of the Society of Automotive Engineers. Tuesday was given over to the meetings of the Standards Committee, which reported at the business session held the following day. The business session on Wednesday morning was opened by president Charles M. Manley, who in his address dwelt upon the relation of the technically trained man to economics. He pointed out that his services would be needed in the development of the resources of the world and in the replacement of manual labor by mechanical devices.

He touched upon the great growth of the motor truck industry, pointing out that the increased cost of labor and operation of the common carriers will mean the eventual use of millions of trucks and the development of motor highway transportation. It is up to the Society of Automotive Engineers, said the speaker, to formulate systems of efficient and economic highway transportation, to develop highway transportation engineers, as well as to bring about decreased maintenance and other costs through the efforts of the technical man. "This work," said Mr. Manley, "belongs to the society and I hope that the society will promulgate it." The importance of the tractor industry was dwelt upon and much important work remains to be done by the technical man.

The report of the treasurer showed a good balance on the right side of the ledger, and the report of the membership committee showed a gratifying increase, there being a net gain of nearly 700 members in 1919, as compared to 1918. It was voted to amend the charter so as to broaden the scope or activities of the society.

Amendments were offered to change the fees and age limit of certain grades—particularly the junior grade. In the discussions following it was argued that it would not be fair to compel an applicant to remain a junior until he attained the age of 32 when he possessed the qualifications of an active member. The amendments were tabled until the mid-summer meeting. The committee on time and place of the summer meeting was not ready, it said, to make its report.

The election of officers for the ensuing year resulted as follows:

For President (to serve for one year): J. G. Vincent.

For First Vice-President (to serve for one year): J. G. Utz.

For Second Vice-President, representing Motor Car Engineering (to serve for one year): W. G. Wall.

For Second Vice-President, representing Aviation Engineering (to serve for one year): G. L. Martin.

For Second Vice-President, representing Tractor Engineering (to serve for one year): H. C. Buffington.

For Second Vice-President, representing Marine Engineering (to serve for one year): C. A. Criqui.

For Second Vice-President, representing Stationary Internal Combustion Engineering (to serve for one year): L. M. Ward.

For Members of the Council (to serve for two years): E. M. Germane, N. B. Pope, A. W. Scarratt.

For Treasurer (to serve for one year): Chas. B. Whittelsey.

Members of the Council who hold over from the previous elections are: Charles M. Manley, past president; David Ferguson and E. A. De Waters.

(Continued on page 111)

List of Motor Truck and Parts Exhibitors at the Chicago Show

Acason Motor Truck Co., Detroit, Mich.
Acme Motor Truck Co., Cadillac, Mich.
All-American Truck Co., Sacramento Blvd, Chicago, Ill.
American Motor Truck Co., Newark, Ohio.
O. Armleder Co., Cincinnati, Ohio.
Atterbury Motor Car Co., Buffalo, N. Y.
Autocar Company, Ardmore, Pa.
Bethlehem Motors Corp., Allentown, Pa.
Clydesdale Motor Truck Co., Clyde, Ohio.
Commerce Motor Car Co., Detroit, Mich.
Day-Elder Motor Corp., Newark, N. J.
Denby Motor Truck Co., Detroit, Mich.
Dependable Tr. & Tractor Co., Galesburg, Ill.
Diamond T Motor Car Co., Chicago, Ill.
Dodge Brothers, Detroit, Mich.
Dorris Motor Car Co., St. Louis, Mo.
Federal Motor Truck Co., Detroit, Mich.
Garford Motor Truck Co., Lima, Ohio.
Gary Motor Truck Co., Gary, Ind.
Gramm-Bernstein Motor Truck, Lima, Ohio.
Graham Bros., Evansville, Ind
Hebb Motors Co., Lincoln, Neb.
Hendrickson Motor Truck Co., Chicago, Ill.
Huffman Bros. Motor Co., Elkhart, Ind.
Hurlburt Motors, Inc., New York City.
Indiana Truck Corp., Marion, Ind.
International Har. Corp., Chicago, Ill.
Jackson Automobile Co., Jackson, Mich.
Nelson Motor Truck Co., Saginaw, Mich.
Kalamazoo Motors Corp., Kalamazoo, Mich.
Kelly-Springfield Motor Truck Co., Springfield, Ohio.
Kissel Motor Car Co., Hartford, Wis.
Maccar Truck Co., Scranton, Pa.
Master Trucks, Inc., Chicago, Ill.
Maxwell Motor Co., Detroit, Mich.
Mutual Truck Co., Sullivan, Ind.
Nash Motors Co., Kenosha, Wis.
Obenchain-Boyer Co., Logansport, Ind.
Olds Motor Works, Lansing, Mich.
Oneida Motor Truck Co., Green Bay, Mich.
Packard Motor Car Co., Detroit, Mich.
Paige-Detroit Motor Car Co., Detroit, Mich.
Parker Motor Truck Co., Milwaukee, Wis.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Reliance Motor Truck Co., Appleton, Wis.
Rainier Motor Corp., Flushing, L. I., N. Y.
Reo Motor Car Co., Lansing. Mich.
Republic Motor Truck Co., Alma, Mich.
Sandow Motor Truck Co., Chicago, Ill.
G. A. Schacht Motor Truck Co., Cincinnati, Ohio.
Selden Motor Vehicle Co., Rochester, N. Y.
Service Motor Truck Co., Wabash, Ind.
Standard Motor Truck Co., Detroit, Mich.
Stewart Motor Corp., Buffalo, N. Y.
Tower Motor Truck Co., Greenville, Mich.
Trailmobile Co., Cincinnati, Ohio.
Transport Truck Co., Mt. Pleasant, Mich.
Union Motor Truck Co., Bay City, Mich.
United Motors Corp., Grand Rapids, Mich.
Velie Motors Corp., Moline, Ill.
Vim Motors Truck Co., Philadelphia, Pa.
Walker Vehicle Co., Chicago, Ill.
Walter Motor Truck Co., New York City.
J. C. Wilson Co., Detroit, Mich.
Winther Motor Truck Co., Kenosha, Wis.

Trailers on Floor With Truck Exhibits

Fruehauf Trailer Co., Detroit, Mich.
Highway Trailer Co., Edgerton, Wis.
Warner Mfg. Co., Beloit, Wis.

Exhibitors of Equipment, Chicago Truck Show

Aluminum Castings Co., Cleveland, Ohio.
American Bosch Magneto Corp., Springfield, Mass.
American Chain Co., Inc., Bridgeport, Conn.
American Machine Co., Newark, N. J.
American Taximeter Co., New York.
F. A. Ames Co., Owensboro, Ky.
Apollo Magneto Co., Kingston, N. Y.
Arrow Grip Mfg. Co., Glens Falls, N. Y.
J. V. Bendus, New York City.
Buda Company, Harvey, Ill.
Buell Mfg. Co., Chicago, Ill.
Bryne, Kingston & Co., Kokomo, Ind.
Challoner Co., Oshkosh, Wis.
Clark Equipment Co., Buchanan, Mich.
Cleveland Heater Co., Cleveland, Ohio.
Continental Motors Corp., Detroit, Mich.
Continental Auto Parts Co., Columbus, Ind.
Cotta Transmission Co., Rockford, Ill.
Dayton Steel Foundry, Dayton, Ohio.
Jos. Dixon Crucible Co., Jersey City, N. J.
Duplex Engine Governor Co., Brooklyn, N. Y.
Eisemann Magneto Co., Brooklyn, N. Y.
Empire Axle Co., Dunkirk, N. Y.
Ericsson Mfg. Co., Buffalo, N. Y.
Essenkay Products Co., Chicago, Ill.
Flint Motor Axle Co., Flint, Mich.
Franklin Machine & Tool Co., Springfield, Mass.
Gray & Davis, Inc., Boston, Mass.
Hercules Motor Mfg. Co., Canton, Ohio.
Hero Mfg. Co., Philadelphia, Pa.
Hudson Motor Specialties Co., Philadelphia, Pa.
Horizontal Hydraulic Hoist Co., Milwaukee, Wis.
Jaxon Steel Products, Jackson, Mich.
Lauraine Magneto Co., New York City, N. Y.
Mead-Morrison Mfg. Co., East Boston, Mass.
Merchant & Evans Co., Philadelphia, Pa.
Minneapolis Steel & Machinery Co., Minneapolis, Minn.
Pantasote Co., New York City.
Parker Axle & Pro. Corp., New York City.
Parry Mfg. Co., Indianapolis, Ind.
Russel Motor Axle Co., Detroit, Mich.
Schrader's, A., Son, Inc., Brooklyn, N. Y.
Sewell Cushion Wheel Co., Detroit, Mich.
Splitdorf Electrical Co., Newark, N. J.
Standard Steel Castings Co., Cleveland, Ohio.
Stromberg Motor Devices Co., Chicago, Ill.
Torbensen Axle Co., Cleveland, Ohio.
Vaporizer Utilities Sales Co., New York City.
Waukesha Motor Co., Waukesha, Wis.
Wellman-Seaver-Morgan Co., Akron, Ohio.
West Steel Castings Co., Cleveland, Ohio.
Wheeler-Schebler Carburetor Co., Indianapolis, Ind.



EDITORIALS



Time for Dealers to Get Busy

THE fact that over $600,000,000 will be spent this year for hard surfaced roads, as compared with only $125,000,000 during the past year, should mean something to the motor truck dealers throughout the country, especially those situated in the territory where a great deal of road work is to be done.

It will not only mean increased traffic on those roads just as soon as they are opened, but it will also result in new transportation companies being formed, for the purpose of doing intercity haulage work. On the other hand, the trucks already in service will be able to increase their efficiency fully fifty per cent. on account of the better roads they can travel.

But regardless of what benefit the roads will produce the greatest benefit the dealers will derive is in the number of trucks they can sell on the strength of the work to be done in building new and repairing old roads. A great number of trucks will be needed by the individual road contractors in many states, even though a goodly number of Government trucks will be used for this work. It will pay the dealer, therefore, to get busy now and line up the contractor trade for the trucks they will eventually need when the road work gets into full swing. Body builders should also interest themselves in this work, as a great many dump bodies are needed for this work. It is a great deal better to be prepared rather than be swamped with orders later on.

Relieving the Parts Situation

THE "assemblers" are the ones most affected by the lack of parts. The concerns producing what are known as "factory built" trucks also receive their share of disappointment occasionally in not being able to complete their product on schedule for the want of some minor parts. However, in such cases it is possible for the factory to use a substitute without in any way causing increased sales resistance of their product. When it is a case of securing engines, axles and the major units the condition becomes one of deep concern for the assembler.

Many a production schedule has been held up unnecessarily during the past year, and which could have been obviated had the parts makers given more attention to the allocation of their product. We refer to the policy of some parts manufacturers in favoring new customers in preference to their older customers, with the result that some of the latter are forced to buy elsewhere or be held up on production.

From this it must be inferred that we would rather have the handicap placed on the newcomer in preference to the well established concern. We are happy to see new blood brought into the industry, for the simple reason that healthy competition is the life of the trade; but we do not see any justice in overloading some concerns with parts—particularly when their selling organization is far from being in shape—to the disadvantage of others who could make use of these parts immediately.

What is needed is a clearing house arrangement and which, we think, would greatly facilitate matters. Such a plan could be effectively carried out by an organization, such as the National Association of Motor Truck Manufacturers, which organization is about to engage a manager for the purpose of promoting the interests of the association. We might suggest that as a part of the duties of this manager he could be of great assistance in helping both the parts as well as the truck manufacturers by keeping in close touch with the production schedules.

By knowing just what each factory is doing this party could give invaluable assistance in the allocation of parts. There are many cases on record now where one manufacturer has enough engines, but not enough axles and vice versa. If such makers could be put in touch with each other an exchange could easily be accomplished with beneficial results to both parties. Concerns about to go out of business could also dispose of left over parts very readily through the association members.

Harnessing Wasted Power

THE recent coal ban in some of the western states was not without its practical side. It was evident that even a coal strike cannot inflict serious damage to the resourceful automobile and truck manufacturer. When the coal bins of some of these concerns began to peter out a great many shops got busy and hooked up internal combustion engines to their line shaftings and work was carried on as usual. Undoubtedly many of these stunts were put over for the purpose of obtaining some good publicity in the daily papers, but then if the idea is practical for a period it was certainly worth while. We believe that if a little more thought were given this matter it is possible that a great many tons of coal could be saved, in some shops, throughout the year and which would otherwise be wasted. It is, of course, impractical to run large factories in this manner. However, in connection with engine building plants, where many engines are being run-in each day, there seems to be no reason why the power thus developed could not be harnessed rather than simply wasted. It might be worth the experiment anyway.

News of the Trade in Brief

A. D. A. Deals Blow to Piracy

NEW YORK CITY, Dec. 30.—There has been a growing tendency among unscrupulous dealers and garagemen of New York City and its vicinity to use, without license or authorization, the names of well known cars in connection with various businesses pertaining to repairing, overhauling and giving service on motor cars. These individuals and companies have listed themselves in telephones directories, etc., in such fashion that they appear next to the real agents and service station and cannot be differentiated from them by those not familiar with the trade. The public is easily deceived into believing that they are the authorized metropolitan distributors.

Some have even gone so far as to insert advertisements in the telephone directory on the page opposite each listing to indicate that said persons were duly authorized repair specialists of these cars. Others have gone still farther and have had their advertisement placed at the foot of the same page on which appeared that of the duly authorized agent.

The situation was growing more and more serious and through the efforts of Harry Gardner, executive secretary of the Automobile Dealers' Association, Inc., New York City, together with Saul Myers, senior counsel for all firms interested and attorney for the Hudson Motor Car Company of New York, Inc., it has been permanently put to an end. Judge Greenbaum, of the Supreme Court of New York, has restrained these trade pirates from continuing such practices and from making any arrangements with the Telephone Company for any objectionable listings and advertisements and has also restrained the company from receiving all such listings.

Mexico Denies Decrease in Petroleum Supply

WASHINGTON, D. C., Jan. 2.—The Mexican Embassy is denying most emphatically the rumors that are broadcast which claim that the Mexican petroleum industry is decreasing. It states that the government is not preventing the production or the exportation of oil by any owners thereof and that there is no cause to fear a shortage of Mexican oil supply attributable to any action of the Mexican government. Any existing shortage may be caused by oil producers or transportation companies who do not wish to ship the article out of Mexico.

Federal Trade Commission to Investigate Price Guarantee

WASHINGTON, D. C., Dec. 26.—There are so many and divers opinions current concerning the question of guarantee against decline in price that the Federal Trade Commission is going to investigate the matter thoroughly. It has invited all producers, manufacturers, merchants (wholesale and retail), and consumers to declare their interest in the

Coming Events

January 17 to 24, 1920—Montreal Auto Trade Association Show. Grand Palace.

January 17 to 24, 1920—Cleveland, O. Auto Show. Wigmore Coliseum. Fred H. Caley, Mgr.

January 17 to 24, 1920—Hartford, Conn. Thirteenth Annual Auto. Dealers' Show. Broad Street Armory. Arthur Fifoot, Mgr., 135 Church St.

January 19 to 24, 1920—Philadelphia, Pa. Commercial Car Show. Commercial Museum.

January 19 to 24, 1920—Schenectady, N. Y. Third Annual Auto Show. Benefit Machine Gun Companies E and F. State Armory. Direction J. J. Callahan, Box 808, Pittsfield, Mass.

January 19 to 25, 1920—Milwaukee, Wis. Auto Show. Bart J. Ruddle, Mgr., Room 316, Brumder Bldg. Trucks, cars, trailers, tractors, motorcycles, accessories.

January 19 to 25, 1920—Oakland Cal. Cars, Trucks and Accessories. Civil Auditorium. R. W. Martland, Mgr. Pacific Building.

January 21 to 25, 1920—Spokane, Wash. Automobile Show.

January 24 to 31, 1920—Chicago, Ill. Commercial Cars and Accessories. International Amphitheatre.

January 26 to 31, 1920—Amsterdam, N. Y. State Armory. Benefit of Co. H. James J. Callahan, Mgr., Box 808, Pittsfield, Mass.

January 31 to February 6, 1920—Kansas City, Mo. Motor Car Dealers' Show. Overland Bldg. E. E. Peake, Mgr.

January 31 to February 7, 1920—Minneapolis, Minn. Twin City Auto, Truck, Tractor and Industrial Exposition.

January 31 to February 7, 1920—New Brunswick, N. J. Second Annual Truck and Tractor Show of Motor Trade Assn. W. A. Kuehl, Mgr., 99 Albany St.

February 2 to 7, 1920—Bridgeport, Conn. State Armory Annex. B. B. Steiber, Mgr., P. O. Box 523. Passenger cars, trucks, tractors.

February 2 to 7, 1920—Toledo, Ohio. Twelfth Annual Automobile Show. Terminal Auditorium. Hugo V. Buelow, Mgr. Passenger Cars, Trucks & Accessories.

February 9 to 11, 1920—Wichita, Kans. Thresher-Tractor Club.

February 9 to 13, 1920—Charlotte, N. C. The Show of the Carolinas. Lee Folger, Mgr.

February 9 to 13, 1920—Louisville, Ky. Annual Good Roads Show and Convention of American Road Builders' Assn.

February 9 to 14, 1920—Greenfield, Mass. State Armory. Benefit of Co. A. J. J. Callahan, Mgr., Box 808, Pittsfield, Mass.

February 9 to 14, 1920—Salt Lake City, Utah. Twelfth Annual Show. Passenger cars, trucks and accessories. Bonneville Pavilion. W. D. Rishel, Mgr., Commercial Club Bldg.

February 9 to 19, 1920—Nashville, Tenn. Automobile Show.

February 9 to 21, 1920—New Haven, Conn. (First week passenger cars). (Second week trucks). Arena.

February 10 to 13, 1920—Fargo, N. D. Fargo-Moorhead Trade Assn. Show. Cars, Trucks and Accessories. S. L. Sheldon, Sec.

February 10 to 14, 1920—Quincy, Ill. Second Annual Automobile, Truck and Tractor Show.

February 14 to 21, 1920—Brooklyn, N. Y. Motor Vehicle Dealers' Assn. Show. (Cars and Trucks). 23rd Regiment Armory. I. C. Kirkham, Mgr., 1635 Bedford Ave.

February 14 to 21, 1920—Detroit, Mich. Nineteenth Annual Show. H. H. Shuart, Mgr., 870 Woodward Ave. Passenger Cars, Trucks, Tractors, Accessories.

February 15 to 20, 1920—St. Louis, Mo. Automobile Show.

February 16 to 20, 1920—Manchester, N. H. (Only show in state). Academy. J. J. Callahan, Mgr., Box 808, Pittsfield, Mass.

February 16 to 21, 1920—Des Moines, Ia. Eleventh Annual Show. 113,000 sq. ft. Ford Motor Co.'s Bldg. Passenger Cars and Trucks. C. G. Van Vliet, Mgr., 203 Observatory Bldg.

February 16 to 21, 1920—Kansas City, Mo. Fifth Annual National Tractor Show. Kansas City Tractor Club. Guy H. Hall, Mgr., Sweeney Bldg.

February 21 to 28, 1920—Ottawa, Ontario. Motor Show.

February 21 to 28, 1920—San Francisco, Cal. Fourth Annual Pacific Automobile Show. Exposition Auditorium. G. A. Wahlgreen, Mgr., 933 Monadnock Bldg. Cars, Trucks, Tractors, Accessories.

February 23, 1920—Pittsfield, Mass. State Armory. J. J. Callahan, Mgr., Box 808.

February 23 to 28, 1920—Portland, Ore. Dealers' Motor Car Assn. Show. Passenger Cars and Accessories only. M. O. Wilkins, Mgr., 312 Commonwealth Bldg.

February 23 to 28, 1920—Louisville, Ky. 12th Annual Louisville Auto Dealers' Assn. First Regt. Armory.

February 23 to 28, 1920—Grand Rapids, Mich. Commercial Car, Truck and Tractor Show. Auspices Auto Business Assn.

February 23 to 28, 1920—Springfield, Ohio. Car and Accessory Show. Auspices Auto Business Assn.

February 24 to 28, 1920—Kansas City, Mo. Motor Car Dealers' Show. Convention Hall. E. E. Peake, Mgr. Passenger cars, trucks and accessories.

February, 1920—Deadwood, S. D. Deadwood Business Club's Seventh Annual Show. F. R. Baldwin, Mgr.

February 28 to March 6, 1920—Car Show. Auspices N. J. Trade Assn. Claude Holgate, Mgr., 343 High St. Passenger Cars, Trucks, Accessories.

March 1 to 6, 1920—Omaha, Neb. Fifteenth Annual Show. Auditorium. C. G. Powell, Mgr., 2051 Farnum St. Passenger Cars, Trucks, Tractors.

February or March (date to be set)—Topeka, Kans. L. W. Warner, Sec., 121 North Kansas Ave.

March 1 to 6, 1920—Perth Amboy, N. J. Eighteenth Annual Car Show. Auspices Auto Dealers' Assn.

March 1 to 6, 1920—Scranton, Pa. Car, Truck and Tractor Show. Auspices Motor Trades' Assn. Armory. Hugh B. Andrews, Mgr.

March 1 to 6, 1920—St. Joseph, Mo. Passenger Cars, Trucks, Tractors, Accessories. John Albus, Mgr., P. O. Box 303.

March 1 to 6, 1920—Syracuse, N. Y. Car and Truck Show. Auspices Auto Dealers' Assn. Howard H. Smith, Mgr.

March 1 to 6, 1920—Buffalo, N. Y. Eighteenth Annual Auto Dealers' Show. Broadway Auditorium.

March 1 to 13, 1920—St. Louis, Mo. First Annual Mississippi Valley Exposition.

March 2 to 6, 1920—Denver, Colo. Car and Truck Show. Auspices Auto Trades Assn. of Colorado. Denver Union Stockyards Area.

March 2 to 6, 1920—Little Rock, Ark. Third Annual Cars, Trucks, Tractors, Accessories, Farm Lights. A. W. Parke, Sec., P. O. Box 699.

March 3 to 6, 1920—Lancaster, Pa. Auto Trade Assn. Show.

March 7 to 13, 1920—Muskegon, Mich. Armory.

March 8 to 13, 1920—Fourth Annual Show. Fifth Regt. Armory. H. MacGinley, Mgr.

March 13 to 20, 1920—Boston, Mass. Eighteenth Annual Automobile Show. Chester I. Campbell, Gen. Mgr., 5 Park Square.

March 22 to 27, 1920—Trenton, N. J. Car and Truck Show. Armory.

March 22 to 27, 1920—Wilkes-Barre, Pa. Commercial Cars. R. A. Rosenkrans, Sec., 35 N. Washington St. (Automobiles, 15th to 22nd.)

March (date to be set)—Jersey City, N. J. **Society of Automotive Engineers.**

New York City, N. Y. Society of Automotive Engineers. Coker F. Clarkson, Sec., 29 W. 39th St. Society and Section Meetings: Jan. 23, Joint meeting Metropolitan and Pennsylvania Sections. Philadelphia. Diesel Engine. Jan. 27, Buffalo Section. Buffalo, N. Y. Feb. 4, Minneapolis Section. Minneapolis. Feb. 12, Tractor Dinner of the Society. Kansas City. Feb. 27, Pennsylvania Section. Pittsburgh. March 3, Minneapolis Section. Minneapolis. Dynamometer Tests. March 23, Buffalo Section. Buffalo. April 7, Minneapolis Section. Minneapolis. Tractor Weights and Drawbar Pulls.

Foreign Events

Adelaide, Australia, March, 1920—All-Australia Exhibit. Motor vehicles, airplanes, engines and automotive equipment.

Buenos Aires, Argentine, April 3 to May 4—Exposition of U. S. Manufactures.

London, England, April or May, 1920—Commercial Vehicle Exhibition. Olympia.

Lyons, France, March 1 to 15, 1920—Spring Exposition.

question so that it may know who should be represented in the investigation. To this end it is asking all associations, etc., to communicate as widely as possible with its membership concerning its interest and to inform the commission of the result. As soon as it is possible to compile a list of parties interested the Commission intends to invite each and every one of them to forward his observations on the subject. These will be filed and classified. Then it will call a meeting of such representatives as can be present and hear the pros and cons. The Commission aims to get this information from the greatest possible number of people and asks each association to do its part in assisting it in the work.

Locomobile Reorganized

BRIDGEPORT, CONN., Dec. 22.—The reorganization of the Locomobile Company of America is almost complete. It will be known in the future as the Locomobile Company. The authorized capitalization of the new organization will be 300,000 shares of no par value common stock and $5,000,000 seven per cent. cumulative preferred stock ($100 par) of which 200,000 shares of common and $3,500,000 of preferred will be issued at once.

The Mercer Motors Co., Trenton, N. J., will, subject to the approval of the stockholders, acquire a large block of common stock of the new company and will take an option to purchase from the latter company 100,000 shares of its common stock at $35 per share. If this is done the Mercer Motors Company will be the largest individual stockholder and will be able to gain control later.

The new company, of which Emel Hare, president of the Mercer Motors Company, is president, proposes to add a medium sized and lower priced Locomobile to its line. It also plans to build up a line of commercial trucks ranging in size from ¾ to 5-ton capacity. These models will not compete in any way with those made by the Mercer Motors Company.

Return of Railroads Will Result in Truck Sales

The return of the railroads to private ownership is bound to result in increased freight rates. This certainty of increased freight rates, together with the inadequacy of the railroad system to cope with the present shipping situation will result, in the very near future, in an oversold high grade truck market. There is also an increase in the demand for trucks in foreign countries and this will influence conditions still more. All those business men who want to make sure that their freight will be expeditiously handled are planning to have enough motor truck transportation on hand and the wise dealer will place his orders now so that he may have sufficient trucks while they are still obtainable.

Symposium on Automobile Industry

Many important issues in connection with the present condition of the Automobile industry as affected by its position in the war will be discussed in a symposium to be conducted under the auspices of the Motor and Accessory Manufacturers' Association. Questions will be considered by leading executives and other authorities and experts in an endeavor to get to the heart of the actual conditions as existing today. In this manner a fund of illuminating information is expected to be brought together. Many vital and interesting questions such as the following will be dissected:

What did the automobile industry learn from the war?

What is the outlook for 1920?

What new tendencies in construction and design will be featured at the 1920 automobile shows?

What are the significant new developments in automotive equipment?

What is the outlook for foreign trade in the automobile industry?

The first statement in this symposium is given herewith. It is an unusually important and significant message from Brigadier General C. B. Drake, U. S. A., Chief, Motor Transport Corps, War Department, who during the war had charge of one of the greatest single motor transportation problems in the history of the industry, and is now directing the peacetime activities of the army's motor transport.

WAR DEPARTMENT

Office of the Chief, Motor Transport Corps, Washington.
From: Chief of the Motor Transport Corps. December 9, 1919.
To: Motor and Accessory Manufacturers' Association, New York, N. Y.
SUBJECT: SIGNIFICANT MOTOR TRANSPORT LESSONS FROM THE WAR.

1. In 1914, the passenger car was fighting its way into the utility class; the truck was a successful experiment to be seriously considered for short local traffic. Good roads agitation tended to put all automobile men under suspicion of being pork barrel politicians.

2. In 1919, the automobile stands in the eye of patriotic America as a tried and true mechanical hero of both war and peace, a stage above the idolized "soixante quinze" field gun of the French nation. Even France now recognizes the automobile as paired with its wonderful field piece for first honors in enabling the outnumbered French Army to withstand the German, while they waited and waited for Great Britain, for Italy and America.

3. Mobility, which is a synonym for superior motor transport, turned the tide and won the war. It is plain that it will be an equal factor in winning commercial fields.

4. The American automobile world must study foreign markets, overseas, shipping, foreign transportation requirements, and the trick of keeping the oversea vehicles running with parts, if possible; without parts, whenever necessary.

5. Service, in the automobile sense, will have a new domestic and foreign world opened to its vision and endeavor.

6. Motor transportation will follow the lessons of the war and operate in larger and larger groups. Perfection of designs and models will no longer monopolize automotive thought. The Allied Armies have much to give the civilian world in motor transport organization, development of operating centers, elimination of "bottle-necks" which throttle terminal and road capacities, road values, training of operating and maintenance personnel, inspection, repair, supply and salvage methods, particularly in interchangeability of parts and accessories.

7. To the Motor and Accessory Manufacturers' Association the Motor Transport Corps, in return for the aid and counsel received in war, must look for understanding of the principle that adequate parts service is in the Alpha and Omega of any motor transportation problem.

8. This means a new grasp by your Association and by manufacturers of the finished vehicles of spare parts experience data. The Army has learned that it must have about 200 parts on each vehicle in quantity, everywhere. Other parts are rarely required.

9. Apparent economies in this class of parts has proven lack of breadth of view. Every user and manufacturer must honestly study and understand quantities required for actual repair, for wider distribution than actual demand, and for shrinkage in factory, in transit, in sales, and in users', service stock. Ignoring human inability to make 110 pieces suffice for 100 new vehicles and 10 actual repair jobs has paid an enormous penalty in useful vehicle hours. All other vehicle hours are a financial burden on manufacturers as well as users.

(Signed) C. B. DRAKE, Brigadier General, U. S. A.
Chief, Motor Transport Corps.

Co-operative Societies Potential Factors in Rural Communities

According to a survey recently made by the Firestone Ship By Truck Bureau, there are about 20,000 farmers' co-operative societies in the United States. Many a farmer does not feel that he can afford to buy a truck and yet he must find some way of getting his products to town. He can, however, afford to consider a substitute in the form of co-operative ownership. This has proven very successful, especially in those states where farmers have been trained in the principles of co-operation. During the last five years there has been a wonderful awakening and now there are about 20,000 of these co-operative routes located in New York, Wisconsin, Michigan, Minnesota, the corn belt states, the Dakotas, Nebraska, Kansas, and the Pacific coast states.

Gasoline Output Exceeds Demand

WASHINGTON, D. C., Dec. 18.—According to figures issued by the Bureau of Mines for the first six months of 1919, there were 296,569,627 gal. of gasoline in surplus of the demand. This country consumed 74 per cent. of the amount produced; foreign countries and our insular possessions consumed 9 per cent., leaving the remaining 17 per cent. revert to stock. This shows a total decrease in the consumption due to the smaller exports of the product.

An Equitable Motor Truck Tax

An ordinance revising the tax on motor trucks, just passed by the Indianapolis City council, is considered the most equitable tax of its kind in the country. Beginning the first of the year, the fees on motor trucks are to be as follows:

Each motor truck with a carrying capacity not to exceed 2000 lb., $4; over 2000 lb. and not to exceed 4000 lb., $8; over 4000 lb. and not to exceed 6000 lb., $12; over 6000 lb. and not to exceed 8000 lb., $16; over 8000 lb. and not to exceed 10,000 lb., $20; over 10,000 lb. and not to exceed 12,000 lb., $24; over 12,000 lb. and not to exceed 14,000 lb., $28.

Truck Reliability Tour Received With Enthusiasm

The First Annual National Motor Truck Reliability Tour, sanctioned by the A. A. A., has been most enthusiastically received by manufacturers who are clamoring for details, rules, etc. The contest, which will center around Omaha, is for trophies offered by the "Omaha Bee" through its owner and publisher, Victor Rosewater.

As soon as they are ready entry blanks will be sent to all manufacturers about twenty of whom have already filed their entries in spite of the fact that no entries have been solicited.

At present the management is arranging a tentative route, taking into consideration roads, bridges, hotel accommodations, and all the other details which make or mar a tour of this kind. The run will cover approximately 2500 miles and be made at a speed of about 100 miles per day. This will allow three rest Sundays.

The tour is being managed by Charles P. Root, Contest Board Representative in Chicago. Mr. Root has had much experience in managing tours of this kind and will employ the lessons learned from former trips in making this one even more successful.

Martin-Parry Conference Full of "Pep"

YORK, PA., Dec. 23.—Officials, distributors and members of the sales force of the Martin-Parry Corporation recently held a conference at the plant. The conference opened with a two-day session, features of which were talks by the president and other officials and a trip through the factory.

On the evening of the third the visitors left on a special train for Indianapolis, where they made a short "get acquainted" tour of the new offices at the Parry plant, after which they listened to a talk on "Sales Opportunities," by Paul Q. Richey, secretary of the Russell M. Seeds Adv. Co. On the morning of the fifth they made a tour of the Parry factory and inspected several new models of bodies designed by Parry engineers.

The conference closed with a series of general conferences.

Truck Shipments Create Competition Among Wholesalers

GRAND RAPIDS, MICH., Dec. 27.—The 19 motor truck routes with their 32 trucks have the staunch support of all wholesale dealers of Grand Rapids who are backing the "Ship by Truck" movement to their greatest ability. It permits them to speed their consignments to nearby Michigan towns and to compete there with Milwaukee dealers. Lake transportation makes it possible for the Wisconsin wholesalers to get their wares into the territory quickly and cheaply and last spring the Grand Rapids men found that the Milwaukee wholesalers were making rapid inroads upon their business. Then the "Ship by Truck" idea came along and now the Grand Rapids dealers claim to be outdistancing their rivals.

The "Ship by Truck" bureau operates through a central terminal which was fostered by the local Firestone "Ship by Truck" bureau and is known as the Associated Truck Lines of Grand Rapids. In addition to the Grand Rapids terminal, central terminals for trucks are operated in Minneapolis, St. Paul and Louisville.

Corrections

Figures under the subhead Tire Cost of Rear of Truck in Mr. Templin's article, "What Needs to Be Done to the Truck to Have It Match Pneumatic Tire Equipment" in the first column on page 124 of the December issue of the COMMERCIAL CAR JOURNAL are erroneous. The following are the correct figures:

2—48 x 12 Tires at $615.75 each.	$1,231.50
4—40 x 8 Tires at 181.20 each.	724.80
Saving	$506.70

It was stated in the copy of the Eisemann Magneto Corporation's advertisement, issue of December 15, that the Riker Truck used the Eisemann Magneto as standard equipment. This was incorrect, as another manufacturer's product is used on this truck.

It was also stated that the following manufacturers used Eisemann Magnetos as standard equipment: Hahn Motor Truck & Wagon Company; Kimball Motor Truck Company; Larrabee-Deyo Motor Truck Company; Union Motor Truck Company and United States Motor Truck Company. As a matter of fact, the magneto used on these trucks is optional.

The errors were caused by rushing the copy for the press at the last moment.

Scotland to Have Show

The Scottish Automobile Exhibition is to be held at Glasgow from January 23 to 31. Both passenger and commercial cars will be included and it is anticipated that a number of new comers will be seen for the first time.

Fuel Conservation Holds No Fears

INDIANAPOLIS, IND., Dec. 15.—When the fuel conservation laws of the state went into effect the Hide, Leather & Belting Company installed farm tractors and gasoline engines in its various manufacturing departments and thus generated power which enabled them to run their plant at full capacity. Other firms were obliged to cut down their power consumption at least 50 per cent.

The company has assured all jobbers and manufacturers that as long as the supply of gasoline holds out deliveries will be made without unnecessary delay.

Foremen Get Special Instruction

HARTFORD, CONN., Dec. 15.—A course in training has been inaugurated by the Tire Division of the United States Rubber Company for their foremen and other members of the supervisory force. The course is conducted under the direction of the Business Training Corporation of New York City. It is not technical, but deals in basic facts and principles.

The topics to be discussed include methods of promoting teamwork in the shops; methods for handling workers so as to promote harmony and efficiency; improved methods of factory organization, etc.

Seeks Unlimited Recognition of Registration Numbers

WASHINGTON, D. C., Dec. 15.—A bill which provides for the unlimited recognition of motor car registration numbers throughout the United States has been introduced into Congress by Representative Burton E. Sweet, of Iowa. It also authorizes the Secretary of State to arrange with foreign nations so that any families going abroad can be equipped with registration tags on which U. S. can be substituted in place of the name of the state.

Parcel Post to Carry Food Supply

WASHINGTON, D. C., Dec. 17.—The Post Office Department announces that it plans to employ the parcel post in its campaign to bring products directly from the source of production to the city markets and so increase the food supply. This spells motor truck transportation.

In connection with the campaign Fourth Assistant Postmaster Blakslee has sent questionnaires to about 200,000 farmers in Virginia, Maryland, Delaware, New York and part of Pennsylvania. These questionnaires include inquiries as to whether foodstuffs are raised for market, the quality of the products marketed, the standard prices, the principal markets reached and the method of transportation. It requests suggestions on how the department can help to arrange for orders from consumers and for payment for foodstuffs delivered.

Personal Items

C. T. Abbot has been elected secretary of the Winther Motor Truck Co. This is in recognition of his assistance in departmental reorganization.

C. Louis Allen is president of the Allen Corporation, New York City. This concern is manufacturing the Pronto simplified, tetrachloride fire extinguisher which Mr. Allen developed.

J. C. Atkinson, formerly associated with the Philadelphia agency for the White truck, has taken the agency in Camden for the sale and service of the White motor truck in southern New Jersey.

F. S. Bacon has been appointed southwestern district sales manager for the Acason Motor Truck Co. He will have his headquarters at Fort Worth, Tex.

E. E. Barber has been added to the manufacturing division of the LaFayette Motors Co., Mars Hill, Indianapolis, Ind.

D. W. Bay, formerly sales engineer of the Motor Bearings Division of the Hyatt Roller Bearing Co., has been appointed sales manager of the Cotta Transmission Co., Rockford, Ill.

A. M. Benedict has been made works manager of the Jackson Motors Corp., Jackson, Mich.

Earl E. Beveridge is now works manager of the Federal Corporation, manufacturer of automobile accessories, Westfield, Mass. Previous to his connection with this company Mr. Beveridge was associated for twelve years with the Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.

H. N. Brandon has been chosen branch manager of the Milwaukee branch of the Bearings Service Co. of Detroit, Mich.

R. Chas. Brower has tendered his resignation as service manager of the Harrison Radiator Corp., Detroit, Mich., and is now a member of the sales organization of the Clark Tructractor Co., Chicago, Ill.

Milton J. Budlong has secured the New York City agency for the Lincoln Motors Co.

G. W. Carlson has been made engineer of the Torbensen Axle Co., Cleveland, O.

H. D. Church has severed his connection as chief engineer of the truck division of the Packard Motor Car Co., Detroit, Mich., and is now vice-president of truck engineering of the Mercer Motor Car Co., Trenton, N. J.

Hamilton Clive has been placed in charge, as sales manager, of the southern territory of the Sanford Motor Truck Co. He will make Atlanta, Ga., his headquarters.

J. R. Coffin has succeeded Allan A. Ryan as vice-president of the Stromberg Carburetor Co.

Guy C. Core is now advertising manager of the Jackson Motors Corp., Jackson, Mich.

E. H. Courtenay has joined the Torbensen Axle Co. in the capacity of sales representative. He was formerly associated with the Hydraulic Pressed Steel Co. and the Shuler Axle Co.

Charles Ethan Davis has been appointed general manager of the Eisemann Magneto Corporation. Before coming to Eisemann he was a member of the Technical Section of the Army War Claims Board, Washington, D. C.

Harry Deering will assume charge of the sheet metal plant of the Hayes Mfg. Co., Detroit, Mich.

J. E. DeLong has been selected as motor engineer by the Indiana Truck Corporation, Marion, Ind.

Charles Drum will return to the Hayes Mfg. Co., Detroit, Mich., on January 15.

F. G. Echols has succeeded Frank O. Wells as president of the Greenfield Tap & Die Corp., Greenfield, Mass.

Harry Fosdick has been made vice-president and secretary of the Monroe Motor Car Co., distributors of the Marmon passenger car, Buffalo, N. Y.

R. N. Gauss has succeeded J. L. Goodall as branch manager of the Indianapolis branch of the Bearings Service Company of Detroit.

J. L. Goodall has been appointed branch manager at New York for the Bearings Service Company of Detroit.

L. B. Griffin is now assistant to the president of the Hayes Mfg. Co., Detroit.

H. J. Guther has been appointed special representative for truck tire sales by the Firestone Tire & Rubber Co. He will have his headquarters in Chicago.

Roy D. Heartz has resigned as general sales manager of the Moreland Motor Truck Co., Los Angeles, Cal.

C. J. Jay has been made assistant treasurer of the Indiana Motor Truck Corporation, Marion, Ind.

Evan F. Jones is now general manager of the Elyria Iron & Steel Co., Cleveland, O. He was formerly president and general manager of the Clinton-Wright Wire Co.

Lewis P. Kalb has been named assistant manager of the Stan-Par axle plants of the Standard Parts Co., Cleveland, O.

J. Kates has succeeded C. F. Rouze as assistant sales manager of the General Motors Truck Co., Pontiac, Mich.

C. H. LeHuquet has been promoted from representative to assistant sales manager of the International India Rubber Corporation, South Bend, Ind.

W. R. Mason has been made New England district sales manager for the Sanford Motor Truck Co. He will have his headquarters in Boston, Mass.

R. C. Merchant has been made sales manager of the Covert Gear Co., Inc., Detroit, Mich. He was formerly connected with the sales and engineering office of the company.

F. S. Montgomery has resigned as advertising manager of the National Metal Molding Co., Pittsburgh, Pa. He is now associated with the Ivan B. Nordham Co., Outlook Advertising, New York City.

H. S. Norton has been made director of sales of the General Top Co., Cleveland, O.

B. V. Osborne has been appointed sales manager of Lacy & Delamater, a new organization formed for the distribution of Service motor trucks in Hudson, N. Y.

Harry Phelps has been made purchasing agent for the Atterbury Motor Car Co., Buffalo, N. Y.

H. T. Porter has been named New York distributor of the La Fayette car. He has not as yet chosen the site of his sales room.

F. W. Ramey has been appointed assistant sales manager of the Cotta Transmission Co., Rockford, Ill.

C. F. Rouze has been made head of the newly formed sales promotion department of the General Motors Truck Co., Pontiac, Mich.

Allan A. Ryan has resigned as vice-president of the Stromberg Carburetor Co. and is now chairman of its board of directors.



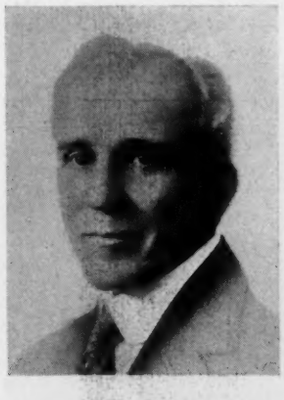
R. H. Townsend

Who has been made chief engineer of the Hooven Radiator Company, Chicago, Illinois. He has been associated with the L-L Nunn interests for the past six years as general construction superintendent.



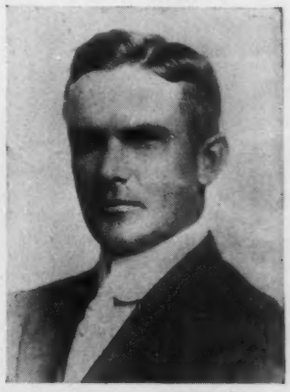
E. J. Berlet

Who has been elected president of the Philadelphia Motor Truck Association for 1920. He is president of the Stability Motors Company, eastern distributors of Atterbury and Defiance Motor Trucks.



E. A. Bates

Who has severed his connection with the Beneke & Kropf Manufacturing Company and is now president and general manager of the Booty Carburetor Company, Chicago, Illinois.



R. P. Henderson

Who has been elected vice-president and director of sales for the Martin-Parry Corporation, York, Pennsylvania, and Indianapolis, Indiana. He will have his headquarters in Indianapolis, where he has been sales manager for the past three years.

Geo. Drake Smith has been elected vice-president and a member of the board of directors of the Winther Motor Truck Co. He came to the company to reorganize the sales, advertising and service departments and with the aid of his assistants, has doubled the shipments for the month of November and has the company booked for orders for the full capacity of its factory.

J. D. Smith is now manufacturing manager of the Torbensen Axle Co., Cleveland, Ohio.

H. D. Snyder has been appointed assistant general sales manager of the Winther Motor Truck Co. He has had many years experience in the service department.

L. D. Speed has been promoted to central sales supervisor of the Northwestern Chemical Co., Marietta, O., manufacturers of Norwesco "Chemically Correct" Utilities.

Russell W. Stovel, recently a Lieutenant-Colonel, Engineers, U. S. Army, has been made a consulting engineer for Westinghouse, Church, Kerr & Co., Inc., New York City. He will devote his time to the electrical and mechanical features of the work.

Godfrey Strelinger, formerly connected with the production department, has succeeded L. B. Griffin in the sales department of the Hayes Manufacturing Co., Detroit, Mich.

Flavius G. W. Sudrow has resigned as zone sales manager of the Chevrolet Motor Co., Kansas City, Mo., and treasurer of the St. Louis Body Co., St. Louis, Mo. He is now identified with the Gardner Motor Co. of St. Louis and will act as distributor of Gardner passenger cars in Kansas City, Mo.

Dan C. Swandler, vice-president and director of sales of the Standard Parts Co., has assumed the additional responsibilities of assistant general manager.

G. W. Veale has been chosen production supervisor of the Torbensen Axle Co., Cleveland, Ohio.

L. H. Ward has resigned as branch manager at New York of the Bearings Service Co. of Detroit.

Robert A. Weinhardt has been appointed chief engineer in charge of the engineering and inspection department of the Supreme Motors Co., Warren, O. Mr. Weinhardt was formerly on the staff of the Continental Motors Co.

Frank O. Wells has resigned as president of the Greenfield Tap & Die Corp. He will remain in the corporation in an advisory capacity.

A. T. Wieland will be superintendent of the body plant of the Hayes Manufacturing Co., Detroit, Mich.

H. D. Wilson has been appointed vice-president of the Herschell-Spillman Motor Co., North Tonawanda, N. Y.

J. Zagora has resigned as designing and production engineer with the Anderson Motor Co., Rock Hill, S. C. He is establishing an organization of his own and will manufacture automotive parts and smaller assemblies for allied industries.

New Agencies

Roller-Smith Co., New York City, manufacturers of electrical apparatus, has opened an office in the Title Insurance Building, Los Angeles, Cal. This office will be in charge of the Electric Material Company, the California representative of the company.

Lampee-Hitchcock, Inc., Boston, Mass., have been given the agency for the Sanford motor trucks in Massachusetts and a portion of New Hampshire.

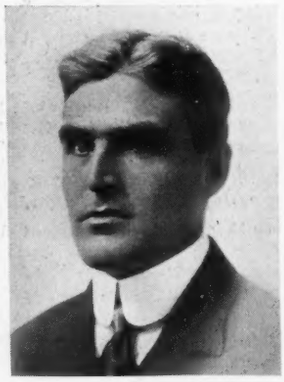
Indiana Boston Truck Corp., Cambridge, Mass., has taken over the sales and service of the Indiana truck.

Lacy & Delamater, Hudson, N. Y., have been appointed distributors for Service motor trucks.

Arkay Sales Co., manufacturers' representatives for automotive equipment, have opened offices and salesrooms at 5 Columbus Circle, New York City. They will sell only to legitimate and organized jobbers.

Mohawk Tire & Rubber Co., Akron, O., has opened its new branch in Los Angeles, Cal. It is located at the corner of Eighteenth and Flower Streets. The company also has western coast branches at San Francisco, Spokane, Seattle and Portland.

Spokane Nash Motor Co., recently chosen as distributors for Nash passenger cars and trucks, has secured temporary quarters at 1523-25 First Avenue.



W. J. McAneeny
Who is president of the Essex Motors, Detroit, Michigan

Factory News and Capital Increases

Burd High Compression Ring Co., Rockford, Ill., is now in its new foundry, which is of such size as will enable it to treble its production.

Kankakee Automobile Co., Kankakee, Ill., is planning to enter its new addition on January 15.

Bound Brook Oilless Bearing Co., Bound Brook, N. J., recently completed a 100 x 180 ft. addition to their plant. They have also added a new two-story office building, 40 x 100 ft., and a new power plant.

Stanwood Rubber Co., Newark, N. J., is building its own factories in distribution centers where it is impossible for it to secure control of factories measuring up to its required standards in producing facilities. Such a factory is being constructed by them at Elizabeth, N. J.

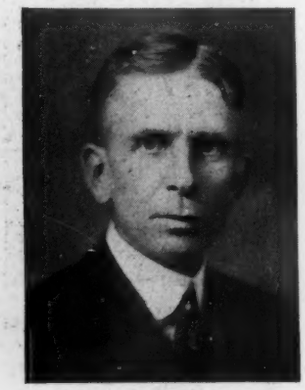
Dittmer Gear & Mfg. Corp., which was recently organized in Lockport, N. Y., for the manufacture of transmissions and gears, expects to be in production in its new plant by January 1.

I. H. Dexter Co., Inc., New York City, manufacturer of the Clark Flexible Couple, is now in its new building at Goshen, N. Y. This will enable it to more than double its production.

Durston Gear Corporation, Syracuse, N. Y., has doubled the capacity and production of its plant.

Federal Bearings Co., Poughkeepsie, N. Y., has begun the construction of an addition to its plant which will be completed in the early spring. This will more than double the capacity and production of its factory. It also announces that its capital stock will be increased from $1,000,000 to $2,000,000, part of which will be used to finance the construction.

Van Dorn Electric Tool Co., Cleveland, O., has increased its floor space 30,000 sq. ft. by the addition of a four-story building in order to take care of the demands for the drilling, reaming and grinding machines which it manufactures.



R. Earle
Who has been appointed sales manager for the F. A. Ames Company, Owensboro, Ky.



Wm. A. Rawson
Who is president of the newly formed Rawson-Upshaw Company, Atlanta, Georgia.



E. N. Upshaw
Who is vice-president and treasurer of the Rawson-Upshaw Company, Atlanta, Georgia.



W. D. Shilts
Who is assistant secretary of the Goodyear Tire & Rubber Co., and chairman of the Board of Control.

Clydesdale Truck Co., Clyde, O., has increased its capital to $1,500,000. It is likewise enlarging its plant and equipment.

Excel Rubber Co., Wadsworth, O., is building a two-story brick building 110 x 180 ft. This will be used for the manufacture of "Flint Cord" and "Excel Fabric" tires as well as all kinds of tire necessities. Production will begin about April 1.

Removals and Trade Changes

Bosworth-Ard Machine & Foundry Co. has purchased the Hale Buggy Mfg. Co.'s plant at Anniston, Ala., and will operate it under the name of the Anniston Truck & Body Co. The plant will be used for the manufacture of truck bodies and automobile tops. The company will also handle automobile accessories for resale.

Leach Biltwell Motor Co., Los Angeles, Cal., has purchased the plant of the Republic Truck Co. at a cost of $250,000.

Master Carburetor Co. announces that it is now occupying its new western factory at Thirtieth and Main Streets, Los Angeles, Cal.

Polack Tyre & Rubber Co. has transferred its general offices from New York to its factory at 145 Howard St., Bridgeport, Conn.

Cook & Stoddard Co., Washington, D. C., announces that it has changed its name to the Washington Cadillac Co. There has been no change in the personnel nor management and ownership of the company.

Columbia Motors Co., Detroit, Mich., announces that it has purchased the plants formerly occupied by the B. F. Everitt Co. and will use them to increase its production.

Wolverine Tube Co., Detroit, Mich., has moved into its new headquarters at 611-625 Central Avenue, where it has better facilities for producing its line of small sizes of seamless tubing.

Automotive Exporter Co., Inc., publishers of The Automotive Exporter, have moved to 438-448 West 37th Street, New York City.

Norma Bearings Co. of America announces its removal from the Bronx, New York City, to Anable Avenue, Long Island City, N. Y., where their new plant, which is being equipped with special machines for precision manufacture, will enable them to meet the demands for Norma bearings. The executive offices, Broadway, New York City, have been consolidated with the plant.

Powell Muffler & Timer Co., Utica, N. Y., announces that its name has been changed to the Powell Muffler Co. Its business will continue to be conducted under the same management.

R. S. Mueller & Co., Cleveland, O., manufacturers of electric test clips and battery charging clips, have been dissolved. Ralph S. Mueller purchased the interest of his partner and will consolidate the clip business with that of the Mueller Electric Co., under which name he will continue the manufacture of clips, attachment plugs, battery handles and other electric specialties.

Toledo Steel Products Co., Toledo, Ohio, formerly the Lewis Steel Products Co., will move to its new plant on Summitt Street and the Maumee River about January 1. When plant is complete it will have a capacity of 50,000 to 60,000 poppet valves daily.

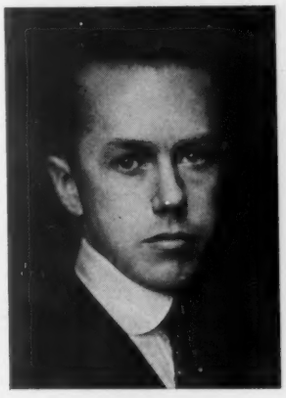
Lancaster Body Co., Lancaster, Pa., has succeeded the Mack Body Co. and is now in possession of a large new building adjoining the factory of the Rowe Motors Mfg. Co. It will manufacture pleasure and commercial car bodies of every description.



Louis J. Schneider
Who has been appointed general sales manager of the Clark Trucktractor Co., Chicago.

New Incorporations

Thompson-Neaylon Mfg. Co., Chicago, Ill., has been organized for the manufacture and sale of rim parts. Officers of the company include Parker C. Thompson, president, and James Neaylon, secretary and treasurer.



John T. Johnson
Who is works manager of the Portage Rubber Company, for Akron, Ohio. He is now working on production plans for the company, which will include the building of a new unit to their plant at Barberton, Ohio.

Fitz John-Erwin Mfg. Co., Muskegon, Mich., has been incorporated for the manufacture of truck bodies and cabs. It is capitalized for $100,000. Its factory with its 25,000 sq. ft. of manufacturing space is located on an eight-acre tract of land, allowing plenty of space for expansion.

Bridgeton Hearse & Ambulance Co., Bridgeton, N. J., has been organized for the manufacture of metal limousine and sedan bodies, metal passenger car bodies and metal and wood truck bodies, as well as hearses and ambulance bodies. J. Paul Bateman is general manager.

J. Zagora Mfg. Co., Charlotte, N. C., has been organized for the manufacture of automotive parts and smaller assemblies.

Malay Rubber Co., Akron, O., has been organized by distributors and dealers in all parts of the country for the manufacture and merchandising of a high-grade tire. The company will build an entirely new plant in Cleveland, O., and will carry on its production along lines that the distributors and dealers shall determine.

General Top Company has been organized in Cleveland for the manufacture of the Artcraft top. Among those mentioned in reference to the incorporation are Christian Girl, R. C. Norton, T. E. Borton and Norman Elliott.



E. R. Downes
Who is sales manager for the F. A. Ames Company, manufacturer of the Amesbuilt line of bodies for Fords, and the Amesbuilt commercial units.



Hayes C. Krimmel
Who has been made manager of truck tire sales, of the B. F. Goodrich Rubber Company, of Chicago, Illinois.



R. C. Merchant
Who has been made sales manager of the Covert Gear Co., Inc. He was formerly connected with the sales and engineering office of the same company.



Owen Moynihan
Manager of the new Malay Rubber Company, Akron, Ohio. He has been general sales manager of the Amazon Rubber Company for the past two years.

American Swiss Magneto Co., Toledo, O., is a newcomer in the magneto field and is the result of a merger of the Swiss Magneto Co. and the Elkhart Mfg. Co. The new organization assures the industry that it will continue the production of the efficient line of high and low tension magnetos formerly manufactured by the Swiss company.

Obituary

Albert M. Gardner, western representative of the Arvac Manufacturing Co., Anderson, Ind., died recently at Chicago. Mr. Gardner was well known by the trade in the western territory and will be greatly missed.

Robert A. Shearer, southern representative of the N. A. Petry Co., Inc., manufacturers of Petry automobile specialties, died recently. Mr. Shearer was well known throughout the industry and will be greatly missed by all those with whom he came in contact.

John Dodge, of Dodge Brothers, Detroit, died in New York of pneumonia. He and his brother Horace went to New York to attend the National Show and while there both were stricken with pneumonia. He is survived by a widow, a daughter and two sons.

Frank A. Williams, president of the Carlsten-Williams Co., tire jobbers, Chicago, Ill., died of pneumonia on December 18. He has been connected with the rubber tire business for over twenty years, having started as an errand boy and worked his way up until he became president of the above company at the time of its organization and has served in that capacity ever since.

Trade Literature

Iron City Products Co., Pittsburgh, Pa., has recently issued a catalog which describes in detail the Rees Double Worm Gear Jack, of which they are the exclusive manufacturers. The advantages and strong points of the jack are enumerated and well illustrated. Rees jacks are obtainable which are suitable for use on both passenger cars and trucks.

Chassis Lubrication is the title of a little booklet recently published by the Chassis Lubricating Co., Inc. It explains the disadvantages of many of the present systems of lubrication and explains in detail the operation of the Myers Magazine Oiling System, which is an improved system applicable to all types and sizes of passenger cars and trucks.

Buffalo Has Wholesale Buyers' Department Store

BUFFALO, N. Y., Dec. 18.—There has been established in the Associated Service Building, a wholesale buyers' department store for the use of the wholesale trade. Now the salesman instead of traveling around to the numerous towns where the various products are manufactured, goes to the Associated Service Building where he is conducted to the Buyers' Club Room in which are displayed thousands of carefully indexed products. From these he selects the lines which he wishes to see; then examines the catalogues and literature of these lines; eliminates that which will do him no good; and is finally conducted to a room in which are displayed models of the articles in which he is interested. Here prices, discounts, etc., are quoted by representatives of the manufacturers, and all arrangements made for delivery, etc.

Firestone Sales Show Big Increase

AKRON, OHIO, Dec. 30.—At the annual meeting of the Firestone Tire & Rubber Company it was announced that the sales of the company are now moving at the rate of $150,000,000 a year and that this is the goal set for the coming year. The company will pay an extra dividend at the rate of $2 per share on all stock of record of December 15. Profits for the year, allowing for depreciation and losses, amounted to $9,306,978.19.

At a meeting of the directors, held the same day, the old officers were re-elected and three additional vice-presidents named. These are A. G. Partridge, vice-president in charge of sales; J. W. Thomas, vice-president in charge of manufacturing, and Thomas Clements, vice-president in charge of offices and purchases. The other officers include H. S. Firestone, president; A. C. Miller, vice-president and general counsel; S. G. Carkhuff, secretary, and J. G. Robinson, treasurer.

James G. Heaslet has been elected president of the Signal Motor Truck Co. to fill the unexpired term of W. K. Hoagland, who resigned.



Convention of the Sales Force of the Bailey-Drake Company, Incorporated, Chicago, Illinois, at Which the Plans of the Company for 1920 Were Discussed.

Standard Rates for Service Station

NEW YORK CITY, Nov. 6.—Over 200 service managers, heads of service station departments and dealers, including representatives from Boston and Newark, N. J., attended the monthly meeting of the Automotive Service Association of New York held last evening at rooms of the New York Automobile Dealers' Association.

The feature of the evening was the description of the flat rate service system used by the Packard Motor Car Company of N. Y. by W. A. Evans, general service manager of the company. The system applies to both passenger and commercial cars and was evolved after experimentation extending over a period of nearly three years. In brief it affords the service station an opportunity to quote a customer a fixed price on any and all repair or replacement work, thereby avoiding the possibility of dispute after the work is completed.

A large number of operations is listed and there are what is termed overlapping operations. These operations are numbered and standardized and the cost is determined by taking the average time of men, cost of material, parts, overhead, etc. A fixed time is set for each operation and workmen are expected to complete an operation in the average time. Those who show greater efficiency are booked for advancement and for bonus.

Statement was made by Mr. Evans that the system had proven very satisfactory both from the owner and company standpoint. It had, he said, practically eliminated great expense involved in looking up disputed labor and material charges as well as losses incurred through collection of accounts. The system was, according to the speaker, adaptable to a shop employing ten or more men. The charts displayed showed that there was a reasonable profit with the flat price system but the point emphasized was that the system afforded the service station manager an opportunity to know exactly what it cost to perform any piece of given work and taught the real meaning of overhead.

Mr. Evans proved a very interesting speaker and cited numerous instances to substantiate the good points of the system as well as answered numerous questions. Complete details of the system are to be made public, the speaker said.

Mann & MacNeille, architects and construction engineers of Detroit, Mich., have added Automotive Department of Mann & MacNeille to their organization. This department is designed to render expert advice and building service to automobile dealers, garagemen, repairmen and others retailing automotive merchandise. It aims to cut the cost of construction and to increase the operating efficiency and sales power of all automotive buildings by improved designs, which result from a long and concentrated study in this field. The company will take contracts for any section of the country.

NEW COMMERCIAL CARS

Ultimate Truck Makes Debut With Four Models

THE Vreeland Motor Company, Inc., of Newark, N. J., announces a line of trucks consisting of four models, these varying in capacity from 1½ to 5 tons; known as Model A, 1½-2 tons; B, 2½-3 tons; C, 3½-4 tons, and D, 5-6 tons. Models A and B are in production and the makers state that deliveries of the 3½ and 5-ton capacity chassis will begin next August. The ratings given differ from conventional practice. The normal load for the Model A is given as 3000 lb., but the maker states this may be increased to 4000 on good roads and be within the factor of safety. The maximum load capacity—including weight of chassis and cab, which is 4500 lb.—is 9550 lb. The normal load for the Model B is 5000 lb., but it may safely be increased to 6000 under favorable operating conditions. The weight of this chassis with cab and fully equipped is 5340 lb. The limit of load under any condition is 1300 lb.

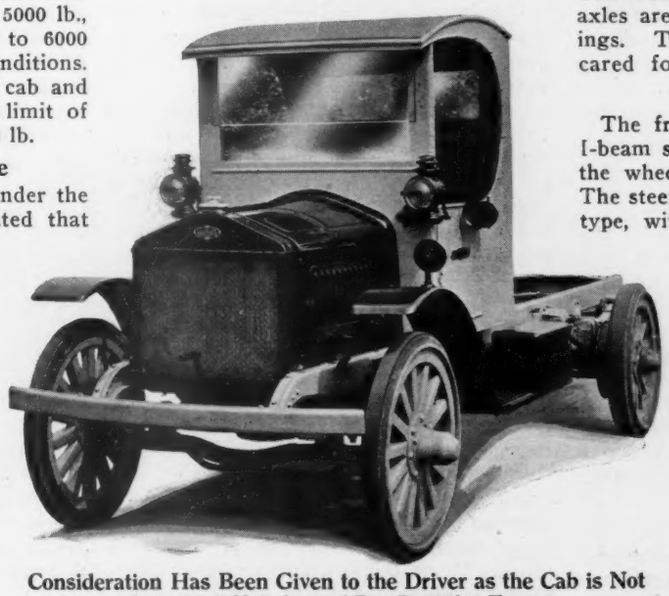
Proper Engineering Balance

The trucks will be marketed under the name of Ultimate and it is stated that the chassis is a replica, insofar as sound engineering practice is concerned, of one that has been on the market for several years. The design embodies refinements in details plus the use of higher grade material and workmanship and greater capacity units. The list price of the 1½-2 ton is about 27 per cent. higher and that of the 2½-3 ton 20 per cent. Effort has been directed toward a design having proper engineering balance, a correct relation of units to meet the requirements of an exacting clientele.

A description of the Model A will apply to the larger capacity chassis insofar as the engineering practice is concerned. The engines used are interchangeable, differing only in the matter of bore and hp. production. The Hotchkiss drive is employed on the Model A and radius rods on the larger capacity chassis. The engine of the Model A is a Buda Model I. T. U., with a bore and stroke of 4 x 5½ in., and an S. A. E. rating of 25.6 hp. Complete details of this engine have been published in these columns. Carburetion is by a Stromberg and control of the air valve for starting is mounted on dash convenient to driver. Ignition is provided by a Type G-4 Eisemann magneto and the leads are heavily insulated. Starting is made easy on the magneto by the use of an impulse starter.

The cooling fluid is circulated by a large centrifugal pump and is aided by an adjustable four-blade 18-in. fan, driven by a 2-in. leather belt. The radiator is of the cast tank construction, the core being of the fin and tube type and removable. It is protected by a heavy wire screen and the water outlet is a large, accessible drain cock, so located as to completely drain the system. Suspension is by rubber cushions and coiled springs. A Pierce governor connected with and driven by engine through bevel gears and shafting is set and sealed at factory to afford a maximum speed of 20 m.p.h.

The clutch is a unit with the power plant which is suspended at three points, the forward end of the engine being supported at crank center by a trunnion bracket on the drop cross frame member. A multiple dry disc type of clutch is employed, it having five steel discs faced on either side with moulded Raybestos, which contracts with inner steel discs when the clutch is in operation.



Consideration Has Been Given to the Driver as the Cab is Not Only Well Upholstered But Provides Every Comfort and Convenience

The gearset affords four forward speeds and a reverse. The ratios are: Reverse, 1 to 4.81; first, 1 to 4; second, 1 to 2.62; third, 1 to 1.50; fourth, 1 to 1. The final gear ratio is 6.5 to 1. All gears are of 6-8 pitch and their faces vary from ⅝ to 1 1-16 in. Shafts are mounted on Timken taper roller bearings and stuffing boxes avoid the possibility of leakage of the lubricant. Gears are of chrome nickel steel, heat treated and oil hardened. The gearshift lever is of the ball rocking type and is mounted directly over the center of the gearset. Use of a latch prevents shifting into reverse when truck is moving ahead without first operating the latch.

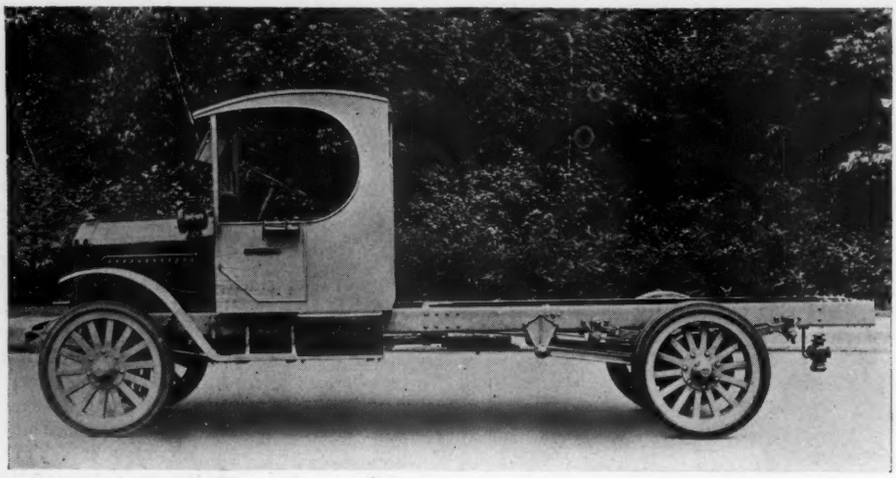
Drive is through a two joint tubular steel propeller shaft, 3 in. in diameter and with a .156 in. wall. The universals are Spicer. The rear axle is of the semi-floating type, worm gear, and the worm wheel has a 2¼ in. face. The load carrying member is a one-piece steel casting, having a large factor of safety, and the worm is of chrome nickel steel. The axle shafts are 2⅜ in. in diameter at point of maximum stress, and are drop-forged from 3½ per cent. nickel steel. The worm, worm wheel, differential and axles are mounted on annular ball bearings. The thrust loads of worm are cared for by a double thrust bearing.

Springs Well Mounted

The front axle is of the conventional I-beam section type, a drop-forging, and the wheel bearings are the Bock taper. The steering gear is of the nut and screw type, with column set at 30 deg. from vertical, and the reduction gear is 12 to 1. The carburetor and magneto controls are mounted over an 18 in. handwheel and are connected to a shaft passing through the center of steering gear, which is connected at bottom end to magneto and carburetor control linkage. The springs, front and rear, are semi-elliptic of chromium silica manganese steel, heat treated. The front members are 39 in. long, 2½ wide, have nine leaves and the spring eye bushings are of phosphor bronze, 1 in. outside diameter and ⅛ in. wall. The rear springs are 52 in. long, 2½ wide, have 13 leaves, and front eye is double wrapped. The bushing material is the same, 1½ in. outside diameter and ⅛ in. wall. The Hotchkiss drive is utilized. The eye in front end of double wrapped spring operates on a 1½ in. hardened and ground steel pin attached to a frame bracket which encloses the front end of the spring, and the eye is bushed with 1½ in. o. d. phosphor bronze. The rear end of the spring is secured to the axle by ¾ in. diameter U shaped clips of chrome nickel steel, and double thick S. A. E. nuts are employed. To prevent shifting of axle the axle spring seat is recessed to fit a cup center around spring center bolt.

The frame is an open hearth pressed steel construction, with side rails 5⅝ in.

deep, 3 in. flange and ¼ in. thick. All cross members are secured by 7-16 in. steel rivets and by heavy gussets. Ample reinforcement is provided by cross shafts which support brackets. A pressed steel channel type of bumper is standard equipment. Wheels are of the artillery type with front members having fourteen 2 in. square spokes and equipped with 36 x 3½ in. solid tires. The rear are similar and have 36 x 6 dual tires. Pneumatics are supplied at extra cost. The wheelbase is 140 in., tread 59½.



The Model B Ultimate Truck of Two and a Half and Three Ton Capacity. The Design is Similar to the Smaller Model and Both Have a Four-Speed Gearset

Reserve Fuel Supply

The fuel supply is a 20 gal. seamless, lead coated steel tank, located under the driver's seat. Outlet is through a large strainer having a drain cock and two shut-off valves. One of these is kept open while the other acts as a reserve valve for about three gallons. The supply is led to a vacuum tank mounted on the dash under the hood. The fuel leads are ample in diameter and the connections are S. A. E. standard. Shut-off cocks are installed between the Vacuum tank and the carburetor.

The driver's seat is at the left with center control. The clutch and brake pedals are sturdy and the former is connected to the clutch operating shaft by an adjustable link, which permits compensating for wear. The brakes are of the internal cam type, 16 in. in diameter and of 2 in. face. The service brake pedal gives a 4 to 1 leverage and is connected to an intermediate brake shaft of ½ in. diameter rod on which is placed a long compression spring. The intermediate brake lever shaft on which are mounted drop-forged levers connecting front and rear brake rods, is carried in self aligning ball bearings, which avoid the possibility of shaft binding as well as affords an unusually easily operated brake system. The rear rods are ½ in. in diameter and have turn buckle adjustments. The levers, shafts and sleeves are serrated, making for easy and quick adjustment.

The pressed steel fenders are made in one piece, ⅛ in. thick and are secured by heavy malleable iron brackets. The hood is of 18 gauge steel, with front and rear edge reinforced with 3-5 in. half oval riveted moulding. The running boards are of 1 in. ash with hardwood cleats to insure firm footing, and boards are supported by three heavy pressed steel hangers.

Consideration has been given to the requirements of the driver by stipulating purchase of a cab with each chassis. The cab is of the all-weather type and one of its features is its width which prevents those draughts noticeable with narrow constructions. The cab is of seasoned ash framing and the three-ply white wood panels are glued and screwed to the framing. The dashboard is a five-ply, ¾ in. thick white wood panel, integral with the cab. The windshield is a two-piece design, ¼ in. glass, and the upper section can be swung either forward or back. The cushions are 6 in. deep, made up in two sections. This facilitates replenishing the fuel supply, as but one section has to be removed. The upholstery is carried up on the back and sides and is four in. thick at a point opposite the small of the driver's back. Side and rear curtains are provided and when attached, it is claimed that the cab is weatherproof. When the curtains are not in use they are stored in a pocket attached to the underside of the top.

Complete Equipment

Chassis parts requiring lubrication are cared for by the pressure feed type of grease cup, having leather plunger, operated by a screw on head of the cup. Cups are accessible and so located as to force the lubricant to the pressure side of bearing, etc. The equipment is very complete. It consists of oil side and tail lights, jack, oil can, oil can holder, 5 lb. cup grease, one gal. engine oil, grease gun, complete set of tools and special engine and rear axle wrenches. A heavy pressed steel tool box is mounted on the running board.

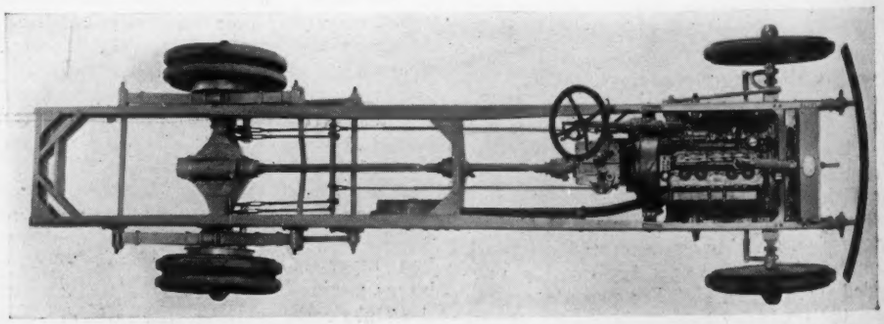
Emphasis is laid on the painting, which is hand work including the priming and lead coats. Statement is made that there are two coats of flat color, one of color varnish and two other coats of varnish. The radiator, hub caps, hood, fenders and brackets, running boards, step hangers and tool box are painted black. Red is employed on the axles, springs, wheels and spring brackets. The cab, frame and front bumper are green, and the latter carries a narrow red stripe and the red a similar green stripe. Provision is made for installing an electric lighting system. The list price of the Model A Ultimate chassis is $3000.

Features of Model B

The Model B has an H. T. U. Buda engine with 4¼ in. bore and 5½ stroke, rated at 28.9 hp. The Pierce governor is set at 16 m.p.h. The multiple disc dry plate clutch has one more disc than used in the Model A chassis. The gear ratios of the gearset are : Reverse, 1 to 4.81; first, 1 to 4; second, 1 to 2.62; third, 1 to 1.50; fourth, 1 to 1. The final gear ratio is 7.75 to 1. The propeller shaft is fitted with three Spicer universal joints, the center joint being retained in a self-aligning ball bearing secured to the frame cross member. The shaft is tubular steel, 2¾ in. diameter with .134 in. wall.

The brakes are 18 in. in diameter, 2½ in. wide, and the same principle of linkage is employed as on the Model A. The front springs are 39 in. long, 2½ wide and have 10 leaves. The rear are 52 in. long, 3 wide and have 16 leaves. The wheels are wood, the front having fourteen 2 in. spokes and the rear fourteen 2½ in. spokes. Solid tires are standard equipment, the front being 36 x 4 single and rear 36 x 4 dual. Option is given of 36 x 8 solid in place of the duals at a slight additional cost. Pneumatics are listed extra.

The driving torque is taken by heavy radius rods of the I-beam cross section type, and the rear ends of rods are attached to rear axle by 1¼ in. hardened



Plan View of Ultimate Two and a Half and Three Ton Chassis Which Has Several Interesting Mechanical Features

and ground steel pins, which pass through phosphor bronze bushings 2¾ in. long. The front end of rods are secured to the frame brackets by 2¾ in. hardened and ground steel balls, permitting the rods to move freely in any direction. Torque reaction is taken by the rear springs.

The frame is 6½ in. deep, has a 3½ in. flange and is of ¼ in. stock. The rear end of the frame is firmly braced with gusset plates and pressed steel channel diagonal braces prevent the frame from getting out of square. The body weight allowance is 1350 lb., and the maximum body length is 12 ft. The wheelbase is 154 in. and the turning radius 24½ ft. The distance back of cab to end of frame is 11 ft. The color plan is the same as the Model A. The list price is $3400.

Edward E. Vreeland is president of the Vreeland Motor Truck Company, Inc., and Samuel D. Weaver is vice-president and general manager. John J. Hoppin is secretary and treasurer. It is stated that the company's distribution plan differs from conventional methods insofar as service is concerned. Careful consideration has been given to the requirements of the small or isolated type of dealer and the parts plan is said to have been worked out after thoroughly studying the needs of the dealer and user.

The Pioneer, New One-Ton Worm-Drive Job

The Pioneer Auto Sales Co. and the Pioneer Truck Co., operating under the new name of the Pioneer Truck Co., 4638 to 48 W. Madison Street, Chicago, Ill., is a corporation incorporated for $500,000. This company is in quantity production on a new one-ton worm drive truck. It is pneumatic equipped and is known as the Pioneer model AA.

The following are the officers of this company: Mr. Otto M. Freier, President, General Manager and Treasurer, formerly with the Ross Motor Co., of Detroit. Mr. Richard Voge, Secretary, Purchasing Agent and Sales Manager, formerly connected with Mr. Freier in the distribution of "Ross 8" cars, through the states of Illinois, Indiana and Iowa. Mr. O. H. Sather, Engineer, formerly associated with the All American Truck Company. Mr. Samuel Miller, Factory Superintendent and Production Manager, formerly of the Alliance Mfg. Co., Shrader, Ill.

The following are specifications of this company's new truck:

Capacity—One ton.

Frame—5-in. channel steel reinforced by cross members and heavy gusset plates, length of frame over all 184 in.

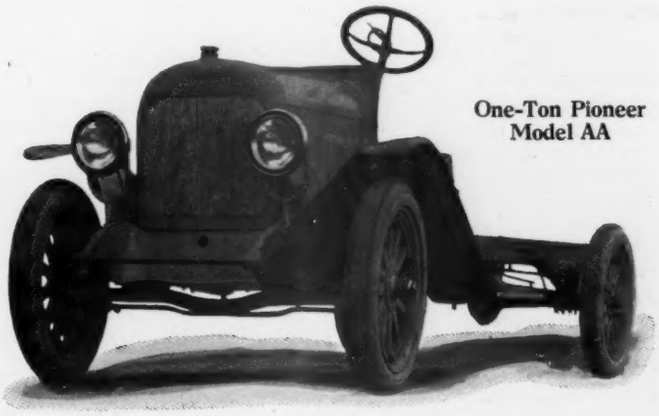
Engine—4 cylinder, L type, cast in block, hot-spot manifold, bore 3¾ in., stroke 4¼ in., thermo-syphon cooling system, S. A. E. rating 22½ hp. at 1000 r.p.m.

Magneto—Dixie.

Starter—Auto-Lite.

Generator—Auto-Lite.

Carburetor—Zenith.



One-Ton Pioneer Model AA

Gasoline Supply—Stewart vacuum system, tank capacity 15 gal.

Radiator—Special designed extra large.

Clutch—3 friction disks are used with fabric facing and runs in a bath of oil. 3 springs are used. Adjustment is easily made by three nuts on three supporting studs.

Transmission—Grant-Lees selective type, 3 speeds forward, 1 reverse.

Steering Gear—Screw and nut type irreversible.

Front Axle—"I" beam Timken bearing and bronze bushed.

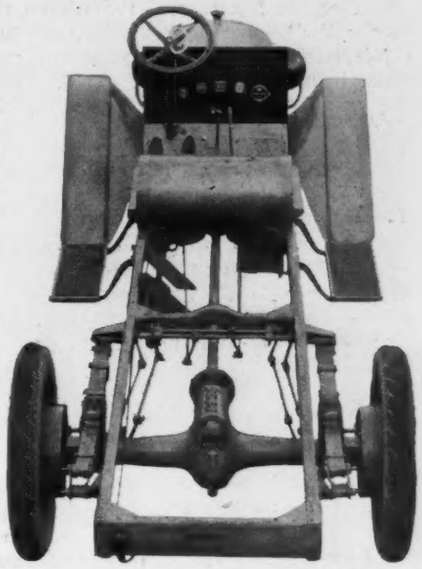
Rear Axle—Worm drive, semi-floating.

Wheels—Artillery type, 1½-in. square spokes in the front, artillery type, twelve 1¾-in. square spokes in the rear.

Rims—Firestone S. S. one extra.

Tires—Firestone pneumatic.

Springs—Semi-elliptic front, 2¼ in. wide, 34 in. long, six leaves bronze bushed; rear semi-elliptic, 2½ in. wide, 36 in. long, twelve leaves bronze bushed.



This View Shows Arrangement of Controls and Equipment on Dash. This Chassis Sells $1385 f.o.b. Chicago

Brakes—Internal expanding, emergency and service.

Wheelbase—130 in.

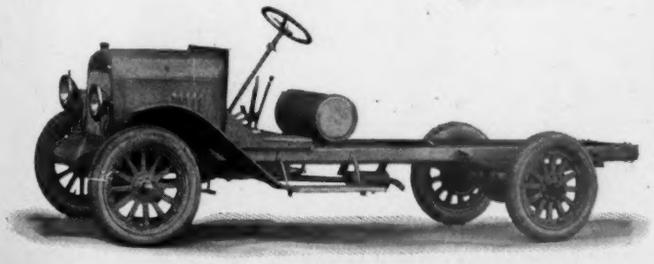
Tread—56 in.

Weight of chassis—2300 lb.

Loading space—8½ ft. back of seat for 9 ft. 6 in. body.

Equipment—2 electric headlights and tail lamp, electric horn, Stewart vacuum tank, Stewart speedometer, oil sight feed, ammeter, running boards, front fenders, tool box and set of tools.

Price—Chassis $1385 f.o.b. Chicago, Ill.



This Job Includes Two Electric Headlights, Stewart Vacuum Tank, Runningboards, Front Fenders, Tools and Tool Box.

Eastern Headquarters for Trailers

NEW YORK CITY, N. Y., Dec. 19.—Offices and exhibition space have been reserved in the International Tractor, Farm Implement & Trailer Exchange in Grand Central Palace by the Trailer Manufacturers of America. The Detroit Trailer Co., the Fruehauf Trailer Co., the King Trailer Co., Martin Rocking Fifth Wheel Co., Northway Trailercar Co., Ohio Motor Vehicle Co. and Rogers Brothers Co., all will have on exhibition on the seventh floor of the building the latest models manufactured by them. Several others are contemplating joining the group.

It is hoped that this will prove of great convenience to all who are interested in the subject of trailers, as it will save them the time of looking up various offices and representatives and going to the various agencies throughout the city.

Oshkosh Four-Wheel-Drive Truck

THE Oshkosh four-wheel-drive truck of two tons capacity and made by the Oshkosh Motor Truck Co., of Oshkosh, Wis., was designed for heavy-duty service and is especially adapted for all kinds of heavy hauling over all kinds of going.

The engine is a Herschell-Spillman, the four cylinders having a 3½-in. bore and a 5-in. stroke. A Duplex governor controls the road speed to 22 m.p.h. From the engine the power is carried to the Brown-Lipe main transmission through a multiple-disk dry-plate clutch. The sub-transmission, which is of own design, includes a driving sprocket and an endless silent chain over a large chain sprocket containing a differential of the automatic locking type. The transmission is equipped with four forward speeds and one reverse, giving the first gear reduction in the main transmission. Gear reductions: 1st, 33; 2nd, 21.61; 3rd, 12.38; 4th, 8.25; and 5th, 39.5. From the main transmission the power is carried through a short propeller shaft equipped with two universal joints which are of Merchant & Evans make, into the center or sub-transmission midway between the front and rear axle. From here the power is transmitted through propeller shafts of equal length to the front and rear axles. The automatic differential lock which is also provided, immediately transfers the full driving power of the engine to the wheels which maintain traction, thus keeping the truck going ahead.

Final drive is through front and rear axles of own make. In general construction they are of the conventional full floating type, the power being transmitted through propeller shafts to the axles through bevel gears of conventional construction.

The engineers when designing this truck had borne the feature of accessibility to the various working parts well in mind. Easy access to vital parts is provided throughout the chassis. The propeller shafts and differentials are interchangeable. The gasoline is fed by the Stewart-Warner vacuum feed system to the Zenith carburetor which is provided with a hot-air intake. The carburetor is non-adjustable but is provided with a choker on the dash to permit easy and convenient starting. The ignition, engine starting and electric lighting system used is the North East electric equipment. A Willard heavy-duty storage battery is also provided. Magneto ignition system is optional.

Cooling is by a thermo-syphon system through a cast fin head radiator with Spirex core of ample cooling capacity. The radiator, with the exception of the core, is of own construction. The cooling system is further assisted by a belt-driven fan 18 in. in diam. which is provided for taking up slack in the belt.

The frame is of A. O. Smith pressed steel 5 in. deep and strongly reinforced with cross members. It is designed to give flexibility to permit unusual twisting of frame without interfering with other units. The Model AA chassis has 165 in. wheelbase, and is equipped with truss rod connections to give additional strength to center of frame.

Steering is through a Ross irreversible steering gear, located on the left side and has an adjustable corrugated wheel 18 in. in diam. The spark and throttle controls are located under the steering gear. A foot accelerator is standard equipment. The service brake is of the external contracting type working on a brake drum located on the front of the sub-transmission on drive shaft, braking through sub-transmission on all four wheels with equal resistance. The brake drum is 8½ in. diam. with a 3½-in. face. The emergency brakes are of the external contracting type on the rear wheels, the brake bands being lined with high grade brake lining. All brakes are of Oshkosh make.

Greater flexibility is claimed to be obtained by the use of the Hotchkiss drive on all four wheels. The springs are guaranteed against any breakage and are of Tuthill-Titanic make. The front springs are 44 in. long, 2½ in. wide, rear 50 in. long, 2½ in. wide. Bronze bushings, ⅞ in., and spring clips, 3¼ in. The wheels are of the artillery type and contain fourteen 2-in. hickory spokes. The pneumatic cord of standard make tires 36 x 6 in., are used both in the front and rear.

The special standard equipment includes: Demountable rims, one extra, enclosed all-weather cab, starting and lighting system, electric button, ammeter, bumper, Detroit engine-driven air pump, heavy-duty truck jack and a complete set of tools.

The price of Model A is $3500 and Model AA $3600, f.o.b. Oshkosh, Wis.



Four-Wheel-Drive, Two-Ton Oshkosh Truck, Pneumatic Equipped. The Price of Model A is $3500 f.o.b. Oshkosh, Wis.

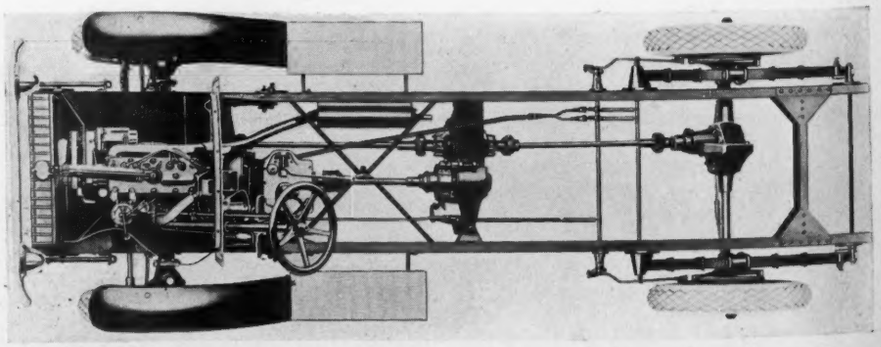
Attachment Converts Passenger Car Into a Truck

The Carrier Motor Truck Co., 1685-87-89 Gratiot Ave., Detroit, Mich., after a great deal of experimental work have placed on the market an attachment of two and three ton capacity, to be used in connection with the Reo Model F or Speed Wagon.

This attachment was designed exclusively for the Reo and is usually built up complete at the Detroit factory, although carry an assortment of units in stock and make the conversion themselves, as the work does not require any tools, other than would be found in any well equipped garage.

Materials used are of the highest grade of truck construction. Axle of internal gear, manufactured by the Russel Motor Axle Company. Both solid and pneumatic tires can be used on rear, according to specification.

The Carrier Motor Truck Company are, no doubt, the largest builders of attachments and the fact that the Reo Motor Car Company, of Lansing, have recommended its use to their many distributors and dealers, is in itself a sufficient recommendation of its merit.



Plan View Shows the Main Transmission, Which Transmits Power to the Sub-Transmission That in Turn Distributes the Power to Front and Rear Axles

Comet One and a Half Ton Truck for Transport Service

THE Comet Automobile Co., Decatur, Ill., is offering to the trade a truck of 1½-tons capacity. It was built for hard use, so that it can withstand the hard knocks of transport work, for which it was particularly designed.

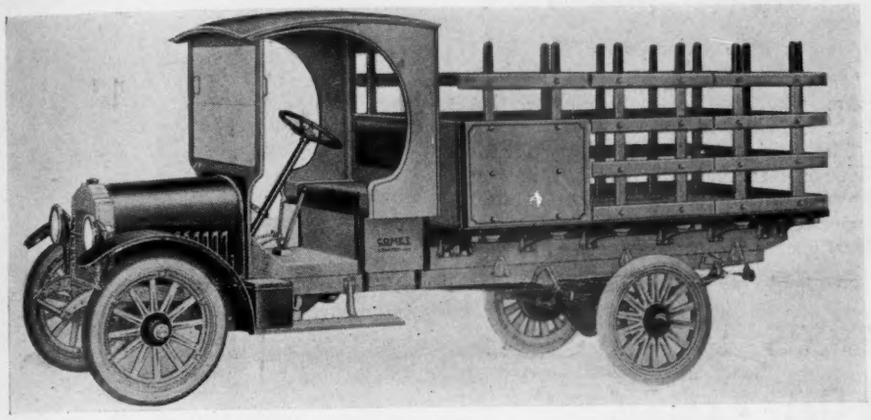
The engine is a four-cylinder L-head type with a 3½-in. bore and a 5-in. stroke. It is rated at 38.6 hp. The power is transmitted through a Borg & Beck 10-in. multiple-disk, dry-plate clutch, which is mounted in the flywheel housing, to the selective type Muncie transmission which, including the clutch, is mounted in unit with the engine. It provides three speeds forward and one reverse. The shift gears are operated from the center. From the transmission power is transmitted through a hollow propeller shaft, equipped with two universal joints, to the rear axle assembly which is of the triple thread worm and worm gear drive type. The gear ratio is 7¾ to 1.

Lubrication is through a combined pressure feed and splash system and cooling by the thermo-typo system. The Standard radiator, having in its construction a cast iron finned shell with deep cellular cores, is included in the cooling system. A Dyneto generator with a Delco distributor and coil connected up with an 80 amp. hr. storage battery provides ignition. The light is also provided by the Delco outfit. The electric starter consists of a Dyneto starting motor with a Bendix drive pinion to teeth in flywheel. Steering is by a worm and complete worm gear. The steering column is 1¾ in., and supports on 18½-in. wheel.

The internal expanding service brakes are operated by a foot pedal and the expanding emergency brakes are operated through the center emergency brake lever. The brakes are all equalized and the drums are 14 in. diam. and 2½ in. wide. The wheels are wood and consist of 12 spokes, 1⅝ in. square in the front and 14 spokes 2¾ in. in the rear. They are equipped with 34 x 4 in. tires, solid in the rear and pneumatic or solid in the front. The frame is constructed of heavy channel section well reinforced with cross members.

The semi-elliptic steel springs are 36¼ in. long and 2 in. wide in the front and 50½ in. long and 3 in. wide in the rear. The wheelbase is 130 in.

The equipment includes head lights, tail lights, electric horn and driver's seat with lazy back. This truck complete sells at $1750 f.o.b. Decatur, Ill.



This One and a Half Ton Comet, With Solid or Pneumatic Tire Equipment in the Front, Sells at $1750 f.o.b. factory

White Hickory Brings Out Two New Models for 1920

The new White Hickory models for the coming year embody the same design which is characteristic in the 1½-ton and the recently announced 2½-ton trucks.

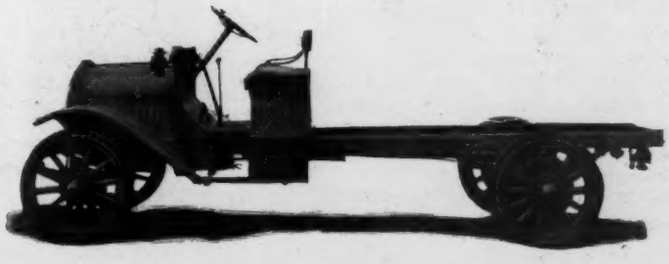
The White Hickory line, manufactured by the White Hickory Motor Corp., Atlanta, Ga., now includes 1, 1½ and 2½-ton trucks.

The new models are a light one-ton chassis and a three and one-half ton chassis. Noteworthy features in these designs are the Hotchkiss drive and the flat springs employed as driving members. Attention is called to the safety wrapper eye on the front end of the rear springs. This resembles the military truck spring, but has in addition a slot in the front for the introduction of a lubricator. The frames are semi-flexible in construction, but are well gusseted to prevent lateral distortion. The power plant is suspended from three points and the radiator is supported on heavy rubber pads. This permits, without detrimental results, a large amount of frame distortion, due to any uneven position of the road wheels. In the one, one and one-half and two and one-half ton models, the engine and transmission are installed as a unit, while in the three and one-half ton model the transmission is hung amidship.

Pneumatic equipment is standard on the one-ton chassis and optional on the remainder.

Standard units, such as Continental engine, Fuller transmission, Timken or Sheldon axles, Eisemann magnetos, Stromberg carburetor and Oakes fan, are employed on these models.

Further specifications concerning these new models can be found in the specification columns of the COMMERCIAL CAR JOURNAL.



This New Hickory Model of the Hotchkiss Drive Design Embodies the same General Features Incorporated in the Earlier Models.

The New Two-Wheel Duplex Limited

The Duplex Truck Co., of Lansing, Mich., in adapting itself to the present existing need in the truck field for a medium capacity continuous service model, capable of running at high rates of speed, has designed and built what is known as the new medium capacity pneumatic equipped Duplex limited. The company in constructing this new model did not attempt to adapt a model designed for other purposes for that of quick delivery, as the company maintains that a construction intended for slow heavy hauling will not stand up under the extra strain imposed upon it by fast driving. Only parts that contribute to quick delivery and strength have been selected.

The power is supplied by a 4 in. by 5¼ in. engine having an S. A. E. rating of 25.6 hp. This engine is a modification of the class "B" design used in Government jobs. This engine will obtain and hold a speed of 25 m.p.h. with a full load at normal engine speed. On high the Duplex limited will travel at from 5 to 30 m.p.h.

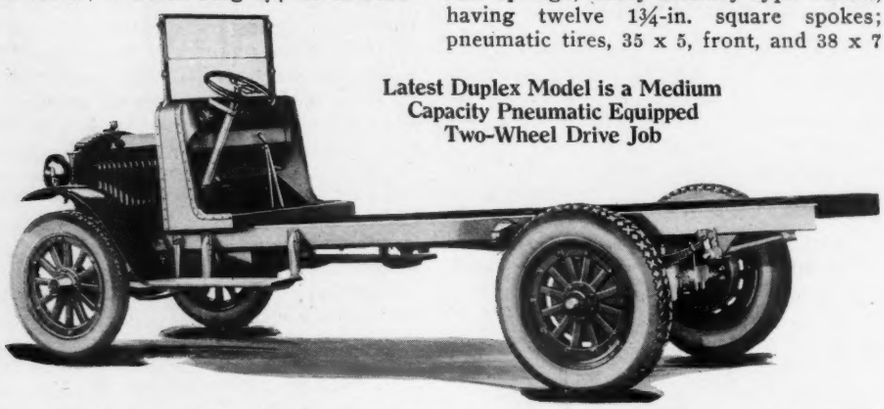
The Duplex company contends that truck speed should be secured through engine power and not through a low gear ratio. This accounts for the adoption of an engine which, at first glance, appears to be too large for a truck of medium capacity. The power is transmitted

through a five-plate, dry-disk multiple clutch to a transmission of selective sliding gear type. Final drive is through a David Brown type of worm gear with a 5.51 ratio. A Stromberg 1¼ in. carburetor is used and electric lighting and starting is provided by a Westinghouse outfit with a 157 am. hr. battery.

The radiator is special Duplex design with cast iron tanks and finned head. The water is circulated by a centrifugal water pump. Cooling is further assisted by an 18-in. fan, driven by a 2-in. leather belt.

The following is a resumé of additional specifications: Front axle, drop-forge, I-beam, 2⅝ in. deep; semi-elliptic front and rear springs; heavy artillery type wheels, having twelve 1¾-in. square spokes; pneumatic tires, 35 x 5, front, and 38 x 7 rear; wheelbase, 145 in.; price, $2575, f.o.b. Lansing, Mich.

The equipment includes: Windshield, electric starting and lighting, ammeter, Boyce motometer, speedometer, electric horn, tools, jack, rim wrench, front fenders, grease gun and driver's seat.



Latest Duplex Model is a Medium Capacity Pneumatic Equipped Two-Wheel Drive Job

Triumph Announces New One and a Half Ton Truck

A new three and one-half ton truck designed to meet the transportation needs of the farmer for use in all conditions of weather and roads has been recently announced by the Triumph Truck and Tractor Co., Kansas City, Mo. It is known as the 1½-ton Model "H" Triumph Truck. The military type radiator, the Russell drive and new model Buda engine, mounted on cushion springs, comprise some of the important parts incorporated in this new truck.

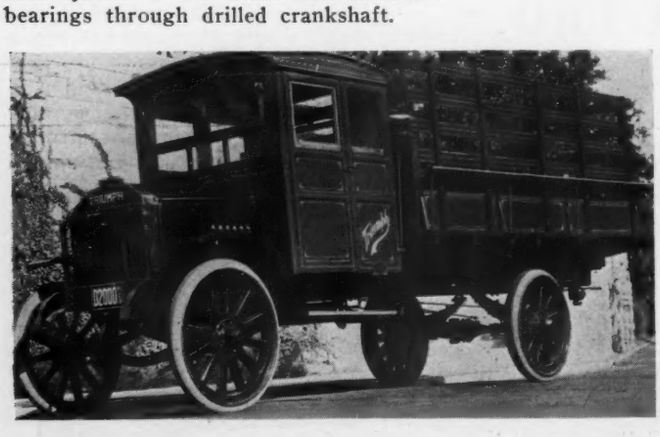
A special feature worthy of note is a heavy steel lattice brace embodied in the frame.

This truck is essentially an assembled job and includes a Buda engine, model C. T. U., with a 3¾ in. by 5½ in. bore and stroke. The speed is controlled to 18 m.p.h. by a Pierce Governor. The water is circulated through the cooling system by a centrifugal pump.

Lubrication is by a full force pressure feed system to all crank and camshaft bearings through drilled crankshaft.

The Bennett float feed carburetor is fed by a vacuum system that draws from a 20 gal. gasoline tank located under the seat. Ignition is by a Dixie high-tension magneto with automatic impulse starter.

Power is transmitted through a Borg & Beck dry-plate heavy-duty clutch, inclosed in a special housing, to a selective type Cotta transmission. The propeller shaft is of the mechanical joint type, having two joints which are inclosed in oil-tight pressed-steel tubing. A Lavine worm-and-nut type steering gear is used. The artillery wheels are equipped with tires of standard make. The wheelbase is 144 in; loading space behind the driver's seat, 120 in.; tread, 56 in.; chassis weight, 3500 lb., and price, $2350 f.o.b. Kansas City, Mo. The equipment includes cab and cushion, front fenders, side and rear oil lamps, horn, tool box, complete tool kit and jack.

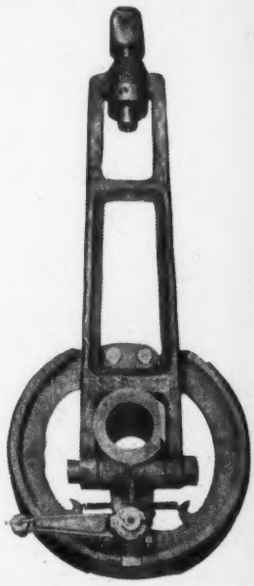


This New Job Especially Adapted for Farm Transportation Service Was Recently Announced by Triumph Truck & Tractor Co.

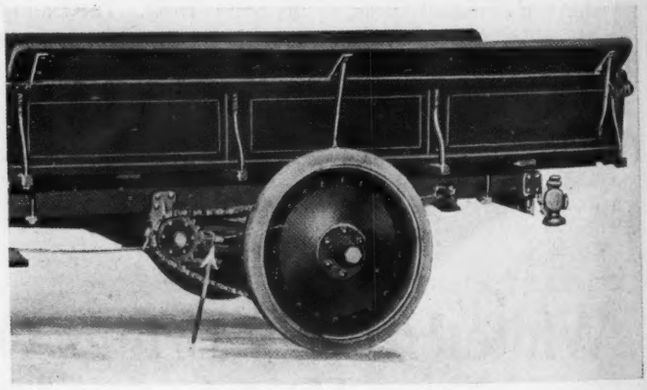
Indestructible One-Ton Truck Unit

The Indestructible Truck Company of Lebanon, Ind., is manufacturing an auxiliary frame and construction that when attached to a Ford chassis will increase its carrying capacity. It is known as the Indestructible One-Ton Truck Unit. This frame parallels the Ford frame from the radiator to more than five feet beyond the rear member of the present Ford frame. The two frames are bolted together. The Ford rear axle is fastened to the truck frame and becomes the jackshaft.

This frame is 14 ft. long, 32 in. wide and is made of 4 in. channel steel 3-16 in. thick. The corners are reinforced with heavy gusset plates and is provided with



View of Radius Rod, It Connects the Axle With Jackshaft



Showing Unit Attached. Attention is Called to One End of the Radius Rod Which Has an Adjustable Swivel to the Jackshaft.

additional cross members fitted into the channel of the side members. In addition to a semi-elliptical steel spring of eleven leaves, 2 in. x 48 in., a relief spring, 2 in. x 30 in. over the rear axle is provided to take care of the overload and to relieve the tension on the side springs when negotiating over rough country roads. When traveling light the load is carried by the side springs only, insuring a more resilient support of the load and easier riding. The brakes, which are of the expanding type on the rear wheels, are operated by a hand lever. The brake shoes are 12 in. in diam. and 2½ in. wide.

Heavy duty Timken taper roller bearings are used in the axle. The machine cut sprockets of the jackshaft have 20 teeth and the rear sprockets have 42 teeth. When attached to a Ford chassis this gives a gear ratio of 6½ to 1. The make of the chains is optional, either the Diamond Chains or Link Belt can be used.

A feature of this unit is the extra strong, specially designed radius rods, which connect the combination axle casing and brake support with the jackshaft hanger on the frame. This construction tends to relieve the springs of power-driving thrust and holds the rear axle in perfect alignment between the spring shackles. One end of this radius rod has an adjustable swivel to the jackshaft and at the other a swivel yoke fits over the rear axle, thus preventing twisting strain on jackshaft and rear axle. The upright swivel joint allows it to move sidewise and gives flexibliity. In this jointed radius rod construction there is ample compensation for every shock and strain.

Standard Indestructible cut steel wheels, provided with solid rubber tires of any standard make, 34 x 3½ in., are used. When this unit is attached it increases the wheelbase of a Ford chassis to 126 in. The tread remains 56 in.

The weight of this attachment is 950 lb., attached to the Ford chassis it weighs 1950 lb. The retail price is $350 f.o.b. Lebanon, Ind.

New Elevated and Dumping Body

A NEW and improved type of elevating and dumping body has been recently placed on the market by the Lee Loader & Body Company, 2343-2350 S. La Salle St., Chicago, Ill. It is known as the Hilo.

The greatest use of the Hilo is in connection with its elevating features. Elevation is accomplished by a cleverly designed system of moving arms acting on the scissors principle. It can be dumped in exactly the same manner as an ordinary body, the only difference being that a deeper dumping angle can be obtained. This makes the body adaptable for dumping sticky materials such as concrete and asphalt.



Body Being Raised by the New Lee Loader Elevating and Dumping Apparatus. It is Known as the Hilo

A hydraulic hoist connected up in the conventional manner operates the Hilo. This hoist manufactured by the Hydraulic Hoist Mfg. Co., St. Paul, Minn., has a cylinder 8 in. in diameter, thus greatly increasing its lifting power. This hoist has also been designed to stop and lock in any intermediate position between the limits of its travel. During the elevation of the Hilo the body remains practically horizontal until the rear end reaches the height desired. At this elevation the rear end remains stationary and the front end continues upward until a suitable dump angle is reached. The maximum height that the tailgate may be raised above the ground depends on the length of the wheelbase of the truck upon which the Hilo is mounted. For most trucks of 15½ ft. wheelbase, this distance is 7½ ft. and with a 15-ft. wheelbase it is 8½ ft.

Any desired elevation of the tailgate is obtained by adjusting a screw mechanism which regulates the distance the rear end travels upward. This adjustment is made by the driver after he has arrived at the coal bin and determined how high the tailgate should be in order to use his chute effectively.

The possibilities of this body in the coal hauling and delivery business is appreciable in view of the fact that it allows material to be chuted for considerable distances across sidewalks and lawns. It can also be successfully utilized in hauling stone, lime and a variety of other loose materials which often have to be dumped into a high pile or into elevated bins or containers.

The Hilo is built in several sizes, grouped according to the capacity of the truck and ranging from three to seven tons capacity, and is designed to fit practically any standard make of truck.

Baking Biscuits Enroute

Many of the largest concerns in the country have bought cars solely for demonstration purposes. Among them are the Fisher Flouring Mills of Seattle. "Blend," the company's dusky chef, is making a tour of Washington, Oregon and Idaho, making mouths water everywhere with his appetizing Scotch "scones" and biscuits. The baking is done in an electric oven with which his Dodge business car is equipped. Crowds collect about the car whenever it stops and "Blend" dishes out the delicacies as fast as he can make them. The car is artistically decorated with the company's name and trade mark, and is proving to be an extremely valuable advertisement.

The results have been so satisfactory that the Fisher Company has ordered another, similarly equipped.

As soon as the present tour is completed the car will be sent back over the same route with a window dressing equipment.

U. S. Truck Sales Managers Meet

COVINGTON, KY., Dec. 30.—About forty district sales managers of the United States Motor Truck Co. attended the annual sales conference held at the factory on December 17 to 20.

At this meeting the company's plans for expansion were explained and the new models for 1920 were made known. These were received with much enthusisam. The session was terminated in a banquet at the Hotel Gibson, Cincinnati.

Sheet Steel Products Co. is building a new plant at Michigan City, Ind., which will enable it to increase it production of steel cabs, seat and dash units, running boards, floor boards and other motor truck and motor car parts.

Economy Body Sales Co., 405 Lexington Ave., N. Y. C., has been succeeded by the Economy Hoist & Body Co., Inc.



SERVICE AND REPAIR DEPARTMENTS



Efficient, Space Economizing Method of Quartering Parts for Dealers With Small Establishments

How One Dealer Devised a Practical Scheme of Arrangement. Satisfactory Disposal of Large and Small Parts. Perpetual Inventory Carried

By C. A. HAMILTON
Assistant Manager of the Federal Motor Truck Company, Inc.

THE small dealer of the type known as the sub-dealer or sub-agent, and who is found in small towns where he is largely a representative of a big distributor in the city, must necessarily conserve space in arranging his parts room. In many instances use is made of an old building the division of which precludes an arrangement in harmony with the suggestions sent the dealer by the distributor or truck manufacturer.

It is surprising the number of parts that can be stocked in a small room and how cheaply the bins, compartments, etc., may be constructed provided the dealer will either play the carpenter or have one of his employees do the constructing which does not require the services of a carpenter. While the metal bins, such as are marketed, are better than the home made affairs, the cost of the manufactured ones frequently deters the young dealer from making the investment.

The writer was at one time confronted by the problem of stocking parts for a car he represented and the only room available for a parts department was a room 20 x 12 ft. In taking over the agency of the car he was required to purchase a certain number of parts and many of these were small—such as magneto and carburetor, nuts, bearings, etc.—which are generally carried in small compartments as are parts of similiar dimensions.



The problem was solved by the use of linen envelopes, about 7 x 11 in., and in these were placed the small parts. Fifteen or more drawers were constructed, each holding twenty-five of these envelopes, and as each envelope holds a fair quantity of small parts, considerable room that would ordinarily have been given over to bins or compartments, was saved.

The parts placed in the envelopes and drawers were filed numerically under the symbol number plan, and the drawers marked No. 1, 25, etc. The symbol of indexing was used throughout and as the parts book of the car manufacturer started with "1" it was a simple matter to arrange the parts in the envelopes. If the parts were small a drawer would contain more envelopes than another with more bulky parts. Parts thus stored were marked with a red star on the stock cards or index two parts.

Two sides of the small room were utilized for the compartments in which were





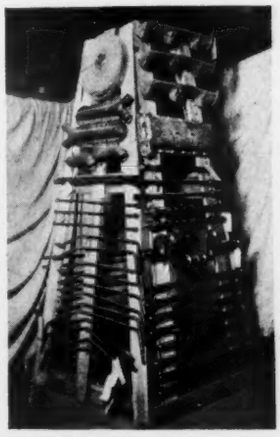
Upper: A View of the Parts Room, Showing Method of Suspending Springs on Spikes Driven in Wooden Strips on Wall. Lower Left: Showing Arrangement of Compartments and Bin With Sizes Graduated; Note Drawers of Envelopes. Lower Right: Showing Sides and End of 12x20 Room in Which Over $10,000 Worth of Parts Were Stocked

stored medium sized parts, and three sides for the bins. The bins were about 24 in. deep and up about 4 ft. from the floor. The compartments above these on the two sides of the room were made of different sizes as may be seen from the accompanying illustrations, the smaller parts being carried in the top section and the larger parts were stored in spaces just above the bins.

Attention is directed to the shape of these compartments. As may be noted there are two rows of small compartments at the top but those directly below were made deeper to care for the longer and more bulky parts. Throughout the plan was to carry the small parts at the top and increase the size of the compartments toward the floor or bins. The drawers containing the envelopes referred to were located on specially constructed shelves in the bin section.

Pyramids Prove Handy

The third side of the room and over one section of bins was employed to carry the springs. This wall was a partition of lattice work, and 2 x 4 in. joists were nailed to it. A railroad type of spike was driven in these joists and the springs suspended.

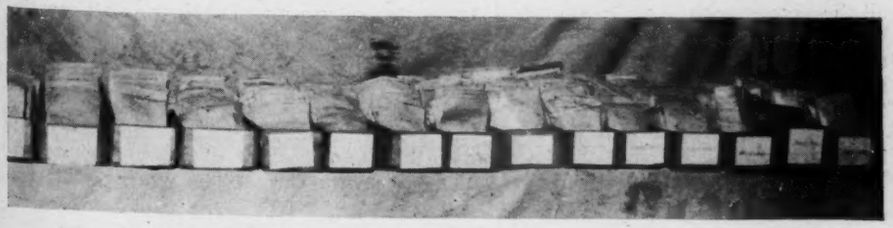


Large Parts, Intake Manifolds, Crankshafts, Axles, Etc., Were Carried on Wooden Pyramids and Insides of These Also Used.

One of the problems confronting the small dealer is to obtain space to stock what we call large or bulky parts such as the intake and exhaust manifolds, cylinder heads, cylinder blocks, exhaust pipes, camshafts, crankshafts, crankcases, axles, brake rods, etc. When placed in bins considerable room is required if a fair amount of parts are stocked. This problem was solved by the use of pyramids constructed of wood. One of these almost reached to the ceiling. On this were racked parts, such as mentioned, and on another but not so tall were carried steering gears complete, rear axles, front axles, tie rods, drag links, etc. Use was made of the inside of these pyramids to carry other long parts such as fuel lines, etc.; radiators were also stored inside.

A card index or stock card similar in principle to that employed by the Federal Motor Truck Co. (this was described and illustrated in the December issue of the COMMERCIAL CAR JOURNAL) was used and a perpetual inventory was kept of the stock. In the majority of compartments and bins a part carried a linen tag bearing the symbol number, etc., and similar identification tags were placed on some of the compartments. Whenever a part was desired the tagged member was not taken unless it was a case of emergency but as the stock card carried a low mark, the tagged part was rarely used. If it was the tag remained in the compartment and was attached to new stock when it arrived.

It may surprise some to learn that over $10,000 worth of parts were cared for by this little room. The parts department was originally constructed to care for a small number of parts but was laid out to meet the requirements of increasing business. The bins, etc., were constructed by the writer and a helper and aside from the 2 x 4 in. joists used for the spring rack, the material was ordinary lumber. The cost was very reasonable.



Illustrating Use of Linen Envelopes for Small Parts. Envelopes Were Filed in Drawers Numerically Under Symbol Number

A Flat Rate System of Estimating Repair Jobs Proves Successful in Autocar Branch

THAT there is a big advantage in being able to tell a customer in advance just what a job will cost, no one doubts. Any method that will prevent "kicks" by customers and their dissatisfaction, will find a hearty reception.

There are two general objections to a "flat rate" plan of estimating repair work that are often given as reasons for not adopting the plan. These are: First, that the customer believes that the price is placed so high that shop cannot lose; second, the dealer or garage owner does not believe that the system can be conducted satisfactorily, so as to be advantageous to his customers and to himself without a very elaborate office equipment, a large office force and great expense. This, he thinks, would result in increased cost to the customer (though greater "overhead") than by charging on the time and material basis.

The truck service plan which is in successful use by the Autocar Sales & Service Co., 23d and Market Sts., Philadelphia, Pa., shows that both of these objections can be eliminated.

The Autocar Sales & Service Co. is a factory branch of the main office and plant at Ardmore, Pa., and is maintained as an ESSENTIAL part of the sales organization. According to Mr. E. W. Moore, the Shop Superintendent, the purpose of the service station is "To give to owners a maximum of service from their Autocar trucks at a minimum of cost."

Such a policy properly carried out furnishes the sales force with sales arguments of tremendous power.

Autocar trucks are guaranteed for one year against defective material and workmanship and the company furnishes the labor, without charge, to replace the defective parts or to make good the defective workmanship during that time.

Proper Inspection Most Imperative

When a customer brings in a truck it is thoroughly, very thoroughly inspected. The success of the flat rate plan depends to a large degree upon the accuracy of the diagnosis by the inspectors. The Autocar inspectors are specially trained for their work. An inspection blank is used which lists every part of the truck likely to need repairs and every part is checked as O. K. or needing attention.

After the inspection is completed a list is made of the work necessary to put the truck in condition. The inspectors specify the exact remedy for any trouble. They may say "Fit new wrist pins and bushings; Tighten connecting rod bearings," but never "Take knock out of motor;" the latter statement would be considered too indefinite.

The operations recommended are listed on a form in triplicate with the price **which includes time and material** opposite each item. One of the three sheets is headed as an estimate for the customer, one is the shop order for the work (if the owner authorizes the repairs) and the third is the office record. When the customer orders the work done he signs the estimate sheet. This establishes a legal contract for the doing of the work at the price quoted and avoids any misunderstanding later.

The prices of all the operations are listed on cards and filed in a card drawer. The index is by units, engine, transmission, rear axle, controls, and so on. The estimate price of any job can be found within a few seconds.

The shop order is placed in a holder with a celluloid front. Slots are cut in the celluloid so the mechanic doing each detail operation can enter in the proper column his own number and the time taken to do the work. The material used is listed on another part of the card. When the job is completed it is figured out from the card on a time and material basis for comparison with the estimate given the customer.

Some idea of the accuracy and successful working out of the Autocar system can be gained from the statement that on $12,000 worth of repair work the estimates and the actual figures (on a time and material basis) varied but $11.

System is Constantly Checked

The original estimates were made by going over repair order records for several years and making up tentative estimates. These were compared with jobs going through the shops for some time before they were used.

A constant effort is made to lower the estimates through increased shop efficiency. By a system of symbols the allowance time for every operation can be checked with the time taken by each mechanic on every job and any variation seen at a glance.

By this means mechanics are quickly shifted around to the sort of work they can do best. If one mechanic constantly runs over the time on engine work he is tried on transmission or axles and finally finds his specialty,—or leaves.

A record is kept of each mechanic showing his efficiency, amount of "bad" work and many other details. These records are used for promotion and increases in pay. Putting it up to the men that advancement depends solely upon individual effort and ability is a powerful incentive to good work and contented workmen.

The service unit plan is used by this company to reduce the length of time a truck is laid up for repairs. For instance, a truck needs a complete overhaul of the engine which takes several days. If the customer is in a hurry for the truck he may have a rebuilt engine put in his truck in place of his own engine. The exchange of engines can be made in one day. The owner pays for the rebuilt engine the estimated cost, at flat rates, of rebuilding his engine. After the exchange his engine is rebuilt and used in the same way in another truck. Transmissions and axles and other units are supplied in the same way.

If necessary, a service truck is rented to a customer during the time his truck is being repaired, assuring him of uninterrupted service. This privilege is of value to truck owners who may have breakdowns during a rush season.

To better care for customers in the area near Pottstown a mobile truck repair shop was put in service about Oct. 1. The equipment is mounted on a truck chassis. The truck engine drives a 110 volt generator which supplies current for an air pump for pneumatic tools, a portable electric drill, emery wheel, drill press and other small tools. A power driven winch is installed to pull out trucks which have run off the road. The outfit also includes a blacksmith's forge; a press for bushings and bearings and a complete set of tools. The truck will also carry unit service parts, including engine, transmission and axles and a stock of repair parts. In fact, the truck will be equipped to do any job on the road or in the customer's yard that could be done in the Philadelphia shop.

The headquarters of this truck are in Pottstown. Trips are arranged with owners in this section.

No charge is made for the "time" or use of the truck. The only charge made is for the time of the two mechanics on the truck and for the parts used.

This service is being conducted solely to assure Autocar owners service at least cost. While overhead expenses are of course taken into account in making estimates no profit is expected. The estimates are carefully checked and revised so that whenever one operation constantly runs under the estimate the price of that operation is lowered.

A constant increase in general shop efficiency has resulted in lowered prices in spite of the fact that the cost of parts has increased and the wages paid to mechanics has also greatly increased.

A card record is kept showing the repair work done on each truck from time to time. These records are of value in showing, for instance, how long it has been since the brakes were relined. The recurrence of one trouble can often be traced to bad driving, overloading or lack of lubrication and means taken to eliminate such troubles in the future.

Building a Drive-in Filling Station*

THE first thing we must consider is what type of building we shall use. If a number of stations are to be operated either in the same city or in a chain of cities, by all means adopt a distinctive type of architecture, color scheme, etc., at the start and then stick to it. The object is to make your stations recognized at first sight even though seen from a distance. For example, practically all of the stations of one company carry a tower, another builds almost exclusively on triangular lots, using a building in the shape of a triangle with the point cut off.

Decide in a general way the kind and size of lot you will endeavor to secure in all or as nearly all cases as is possible; investigate as to what is to be handled in the way of stock; and determine your general operating scheme. Then you can have building designed to meet conditions.

Plan the building solid, substantial and attractive, but not of the "ginger bread" type. Bear in mind that it is a place of business. It should be designed in such a manner that it can be placed in the better residence districts without causing ill feeling to your neighbors.

I would recommend that the building should be wholly fireproof, or at least semi-fireproof, whenever possible.

Basements

The question of a basement is one which has received a great deal of discussion and attention, particularly at the hands of two or three of the larger companies. The advisability of a basement depends largely on the proposed method of operation. It would seem that the first and likewise the most important factor entering into the question as to whether a basement was necessary or not, is whether the property is large enough to accommodate a building with all the necessary toilets, etc., on one floor, and still give ample room for the necessary driveways. If not, then the floor space must be cut down by putting in the basement.

The gentlemen's toilet, air compressor, heating plant and the fuel can be placed in a basement to good advantage, and when tires, accessories or lubricating oil in cans are handled at the station a small reserve stock can be stored in the basement. A basement properly built will add 25 per cent. to 30 per cent. to the cost of a building, as compared with one of the same design without a basement.

Rest Rooms and Toilets

Nearly all stations built within the last year have at least one toilet. One of the large cities has passed an ordinance making at least one toilet with a floor space of 30 square feet obligatory. The better class of stations have two toilets.

Valuable sites on park property have been obtained by one company for filling station use by constructing a complete comfort station, having entered into an agreement with the city to maintain it in a sanitary condition for a specified term of years and to furnish all supplies, towels, soap, etc.

A number of stations are also equipped with a ladies' rest room in addition to the toilet. In one station recently visited, the rest room was large enough to hold three good sized chairs and a writing table with chair. The writing table was

*(This is the second of a series of articles written by F. A. Bean, Consulting Engineer, Wayne Oil Tank & Pump Co., on the planning, arrangement, equipment and management of filling stations.)

Service and Repair Departments Continued on Page 114

KEY OF ABBREVIATIONS

Used in the Specifications of Commercial Cars Listed on the Pages Following

In all Specifications: { O—Own / Q—Optional }

Engine:
Cont—Continental
GBS—Golden, Belknap & Swartz
Her—Hercules
Hink—Hinkley
H-Sp—Herschell-Spillman
Lyco—Lycoming
Ster—Sterling
Vict—Victory
Wau—Waukesha
Wis—Wisconsin

Valve Arrangement:
L—ELL-Head
T—TEE-Head
O—Overhead
S—Sleeve

How Cooled:
A—Air
C—Centrifugal Pump
G—Gear Pump
P—Water Pump
T—Thermo-Syphon

Radiator (Make or Type):
Bus—Bush
Can—Candler
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Idl—Ideal
Lng—Long
McC—McCord
May—Mayo
Per—Perfex
R-T—Rome-Turney
Spi—Spirex
Stan—Standard
C—Cellular
T—Tubular
H—Honeycomb

Size of Tires:
*—Pneumatic
†—Dual

Lubrication:
C—Centrifugal Pump
F—Force Feed
G—Force and Gravity
B—Force and Splash
P—Water Pump

Carburetor:
B&B—Ball & Ball
Bent—Bennett
Cart—Carter
Flch—Flechter
Ens—Ensign
Holl—Holley
John—Johnson
Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Till—Tillotson
Zen—Zenith

Fuel Feed:
G—Gravity
P—Pressure
V—Vacuum

Ignition System:
AtK—Atwater-Kent
AuL—Auto-Lite
Bat—Battery
Bos—Bosch
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
Mag—Magneto
NE—North East
POL—Prest-O-Lite
Sim—Simms
Spl—Splitdorf

Engine Starter:
L—Auto-Lite
B—Bijur
D—Dyneto
G—Gray & Davis
E—Leece-Neville
N—North East
R—Wagner
W—Westinghouse

Clutch:
B—Borg & Beck
C—Cone
D—Disc
F—Fuller
G—Detroit Gear & Mach.
H—Hartford
L—Brown-Lipe
M—Merchant & Evans (Hele-Shaw)
U—Muncie
W—Warner

Transmission:
B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
D-Sea—Driggs-Seabury
Det—Detroit
Durst—Durston
Full—Fuller
G-Lee—Grant Lees
MM—Mechanics Mach. Co.
Munc—Muncie
Plan—Planetary
Rock—Rockford
Selec—Selective
Warn—Warner

Location of Transmission:
A—Amidships
R—Rear
U—Unit with motor
UJ—Unit with Jackshaft

Final Drive:
B—Bevel Gear
C—Chain
N—Concentric Spur
E—External Spur Gear
F—Friction
I—Internal Gear
S—Spiral Bevel
P—Spur
W—Worm
R—Double Reduction

Universal:
Acm—Acme
Arv—Arvac
Bld—Blood Brothers
Flex—Flexite
Hart—Hartford
K-B—Kinsler-Bennett
Mech—Mechanics
M—Merchant & Evans
Pet—Peters
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products

Rear Axle:
Badg—Badger
Cel—Celfor
Chi—Chicago
Cl—Clark
Emp—Empire
Rock—Rockford
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Stan—Stan-Par
Tim—Timken
Torb—Torbensen
W-M—Weston-Mott
Flot—Floating
½-Fl—Semi-Floating
¾-Fl—¾ Floating

Springs:
Bran—Brantford
Cham—Champion
Det—Detroit
GC—Garden City
Kal—Kalamazoo
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Per—Perfection
Row—Rowland
Shel—Sheldon
SP—Spring Perch
Stan—Standard Parts
Ster—Sterling
Tem—Temme
Tut—Tuthill
US—United States
Cant—Cantilever
Elip—Full Elliptic
S-El—Semi-Elliptic
¾-El—¾-Elliptic
S&C—Semi and Cantilever
S&¾—Semi and ¾-Elliptic

Steering Gear:
CAS—C. A. S. Products Co.
Dit—Ditwiler
Gem—Gemmer
Jac—Jacox
Lav—Lavine
W—Worm
Warn—Warner
Wohl—Wohlrab

Governor:
C—Centrifugal
Cont—Continental
Del—Delaney
Dup—Duplex
Hink—Hinkley
Mer—Merrill
Mon—Monarch
Pier—Pierce
Rug—Ruggles
Simp—Simplex
Wau—Waukesha

Wheels:
Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Cla—Clark
Day—Dayton
Det—Detroit
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Jon—Jones
Kel—Kelsey
Mil—Military
Mut—Mutual
Pru—Prudden
Roy—Royer
Rus—Russell
Sal—Salisbury
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wan—Wayne
W&L—Waterhouse & Lester

Rim Equipment:
Bak—Baker
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Jax—Jaxon
Kel—Kelsey
Stn—Standard

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given they may be had on application to the manufacturer)

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
800 Pounds																		**800 Pounds**													
Overland	1777	900	Own	3⅜x5	18.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	B	¾-Fl	.....	.....	S&C	31x4*	31x4*	Own	104	.....	.....	.....	63.8
Pony	800	320	Own	2¾x4	12.1	L	T	H	B	Strm	G	AtK	...	...	Fric	3	....	Dead	C	O	4.25:1	12.25:1	Tut	28x3	28x3	Own	92	.....	Pru	.....	60
1000 Pounds																		**1000 Pounds**													
Dodge	1975	1010	Own	3⅞x4½	24.1	L	C	T	B	Stew	V	Own	N	D	Selec	3	U	Own	S	Flot	4.16:1	19.43:1	.....	33x4	33x4	Own	114	.....	Own	Own	41
Ellsworth 25A	2100	....	Lyco	3¼x5	16.9	L	T	T	S	Cart	G	Con	A	C	GLee	3	U	Stan	B	Gem	4.75:1	16:1	Shel	30x3½*	30x3½*	Fos	108	.....	Sal	Det	70
Indiana 12	4000	2300	Wau	3¾x5¼	22.5	L	C	T	S	Strm	G	Eis	...	B	Selec	3	A	Acme	W	½-Fl	7.8:1	28.4:1	S-El	34x3½	34x5	Wohl	134	Wau	Bim	.....	65
Vim 27	2120	1095	Own	3 x4½	14.4	L	T	McC	B	Zen	G	Atk	...	C	Selec	3	U	Spic	W	Shel	5.5:1	.....	Shel	31x4*	31x4*	Jac	108	.....	Hoo	Fir	....
Vim 28	2250	1350	Own	3 x4½	14.4	L	T	McC	B	Zen	G	AtK	...	C	Selec	3	U	Spic	W	Shel	5.5:1	.....	Shel	32x4½*	32x4½*	Jac	127	.....	Hoo	Fir	....
1200 Pounds																		**1200 Pounds**													
Overland	2179	....	Own	4⅛x4½	27.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	S	¾-Fl	.....	.....	S-El	33x4½*	33x4½*	Own	106	.....	.....	.....	68.8
1500 Pounds																		**1500 Pounds**													
Atlas 19	2320	1260	Lyco	3½x5	19.6	L	T	H	S	Sheb	...	AtK	R	B	Selec	3	....	Arv	B	Hess	.....	.....	Row	32x4*	32x4*	CAS	118	.....	.....	.....	60
Diehl A	2400	1575	Cont	3½x5	19.6	...	T	H	B	Zen	G	Bos	...	B	Durst	3	....	K-B	I	Torb	5.33:1	3.5:1	Mar	34x4½*	35x5*	Jac	115	.....	Sch	Fir	90
Dispatch G	2200	1200	Wis	3¾x5	22.5	L	T	C	F	Rayf	...	Bos	U	O	Own	4	....	Bld	C	Dead	.....	.....	Tut	34x4*	34x4*	W	120	.....	.....	.....	50
G.M.C. 16	2940	1595	Cont	3¾x5	22.5	L	C	McC	S	Mar	G	Eis	...	D	Selec	3	U	UM	B	WM	6:1	21.9:1	Det	35x5*	35x5*	Jac	132	Mon	.....	Bak	67
International H	2800	1550	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	7:1	25:1	.....	36x3	36x3½	Ross	115	Own	Own	Fir	50
Old Hickory M	2100	995	Lyco	3¼x5	16.9	L	T	C	S	Cart	G	Cov	D	C	Selec	3	U	Own	B	½-Fl	6:1	18:1	.....	33x4*	33x4*	W	112	.....	Sal	Sta	60
Oldsmobile	2324	1250	Own	3 1/16x5¼	21.7	O	C	Own	B	Zen	V	AuL	L	C	Selec	3	U	Hart	I	Torb	6.5:1	38.87:1	S-El	35x5	35x5	W	128	.....	AuW	Jax	73
Rainier R11	2350	1750	Cont	3½x5	19.6	L	T	Har	...	Zen	V	Sim	...	D	B-Li	3	....	Hart	W	Timk	7.2:1	23.9:1	Per	34x4½	34x4½	Lav	125	Mon	Sch	Fir	80
Reo F	2525	1285	Own	4½x4½	27.2	L	C	Own	S	John	G	Rem	R	O	Own	3	....	Own	B	Own	4.6:1	17.2:1	Penn	34x4½*	34x4½*	Own	128	.....	Pru	Fir	62.5
Shaw M-2	2400	1975	Cont	3¾x5	22.5	L	T	T	B	Zen	...	Bos	...	D	B-Li	3	U	Spic	G	Timk	.....	.....	Per	32x4*	32x4*	Gem	116	.....	.....	.....	65
Stewart 11	2190	1195	LeRoi	3⅛x4½	15.6	L	T	T	B	Zen	G	Eis	D	B	Durst	3	U	Hart	I	Cl	6:1	18.06:1	Det	32x4	32x4	CAS	110	.....	Wan	Fir	66.7
Texan A38	2500	1340	Lyco	3½x5	19.6	L	T	H	B	Cart	G	Del	D	B	Munc	3	....	UP	B	Flot	.....	18.6:	Cant	33x4	33x4	CAS	112	.....	.....	.....	60
White 15	2960	2400	Own	3¾x5 ⅛	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	B	Own	.....	.....	.....	34x4½*	34x4½*	Own	133	.....	.....	Fir	70
White Hickory	....	....	Cont	3¾x5	22.5	L	C	T	B	Strm	...	Eis	...	D	Full	3	....	.....	W	Timk	.....	.....	S-El	34x4½*	34x4½*	W	124	Simp	.....	.....	....
1 Ton																		**1 Ton**													
Acason R	3650	2100	Wau	3¾x5¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	U	Bld	W	Timk	8.25:1	33:1	Det	36x3½	36x5	Ross	142	Wau	Bim	.....	73
Acme B	3376	2075	Cont	3¾x5	22.5	L	T	GO	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	7.75:1	31:1	Det	34x3½	34x5	Ross	130	Dup	Bim	.....	80
All-American A	2600	1595	H-Sp	3½x5	16.9	L	T	Stan	B	Strm	G	Sim	...	B	GLee	3	....	UP	I	Torb	8:1	18:1	Det	33x4*	32x4	Ross	130	Pier	Stn	Gyd	75
Apex C	2870	1395	Buda	3½x5 ⅛	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	6.5:1	19.5:1	Det	33x4*	32x3½	Lav	130	.....	.....	Fir	70

Beck-Hawkeye A.	2800	1650	Cont	3¾x5	22.5	L	T	Har	S	Strm	G	Bos	...	F	Full	3	....	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	34x5	Lav	124	Pier	Hay	Fir	75
Belmont A.	2000	1150	GBS	3¾x4¼	22.5	L	T	GO	S	Zen	G	Con	D	P	Selec	3	U	Ster	B	¾-Fl	5.25:1	15.75:1	S-El	31x4*	31x4*	Lav	113	.....	E&O	Stn	60
Bessemer G.	2900	1600	Cont	3½x5	19.6	L	T	C	B	Zen	...	Bos	...	F	Full	3	....	Arv	I	Torb	.....	.....	Per	34x3½	34x4	Ross	124	.....	.....	.....	57
Briscoe T34	....	....	Own	3⅜x5	18.2	L	T	C	B	Buic	G	Bat	L	C	Own	3	U	UM	I	Russ	8.2:1	23.4:1	S-El	33x4	34x3½	Lav	121	.....	.....	Jax	....
Cameron D	....	2400	Own	3x4½	21.6	O	A	.....	B	Zen	...	.....	B	B	Selec	3	....	Ther	I	Torb	12:1	.....	Bran	36x6	36x6	.....	136	.....	.....	.....	....
Chevrolet T.	2840	1325	Own	3½x5¼	21.7	O	C	Har	B	Zen	...	Rem	L	C	Warn	3	....	Arv	W	½-Fl	.....	.....	Hess	33x4*	35x4*	Warn	125	Mon	.....	.....	....
Chicago C-1	3100	2200	Her	3¾x5⅛	22.4	L	.	T	F	Strm	G	Bos	...	L	B-Li	3	U	Peters	W	Timk	7.75:1	25.8:1	Math	36x3	36x4	Gem	132	Simp	Q	Stn	....
Clydesdale 32X.	3400	2185	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	U	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	.....	.....	72
Collier 18.	....	1650	Cont	.....	19.6	..	..	.....	S	.....	...	.....	...	F	Full	..	.....	.....	..	.....	.....	.....	W	Own	34x4	34x5	.....	140	Mon	.....	.....	....
Columbia F.	2800	1750	Cont	3¾x5	22.5	L	C	T	B	Shk	G	Dix	...	B	Covt	3	U	Spic	I	Russ	7.5:1	21:1	Per	34x3½	34x5	Own	125	Pier	StM	Fir	70
Commerce E.	2900	1590	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	U	Spic	I	Torb	8:1	22.9:1	Det	35x5	35x5	Jac	126	.....	Bim	Fir	80
Conestoga 20.	3300	2100	Cont	3½x5	19.6	L	T	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	7.75:1	23:1	S-El	34x3½	34x5	Ross	128	.....	E&O	Stn	90
Corbitt H	3250	2200	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	6.5:1	19.5:1	Shel	34x3½	34x4	Ross	130	Simp	Bim	Fir	75
Dart H	3200	2100	Buda	3¾x5½	22.5	L	T	C	F	Zen	V	Eis	...	F	Full	3	U	Spic	W	Own	8:1	20.3:1	Per	34x3½	34x5	Ross	130	Pier	Pru	.....	80
Day-Elder A.	3250	1925	Cont	3½x5	19.6	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	7.75:1	28.3:1	Shel	34x3	34x4	Ross	128	.....	Jon	Stn	70
Denby 12.	3100	1950	Cont	3½x5	19.6	L	T	L	B	Strm	G	Eis	...	F	Full	3	U -	UP	I	Russ	8.2:1	26.2:1	Det	34x3	34x4	Ross	124	Mon	Hay	.....	73
Douglas C.	2750	1700	Buda	3½x5½	19.6	L	T	Own	B	Sheb	...	Eis	...	F	Full	3	....	Arv	I	Torb	.....	.....	Own	34x4½	35x5	Ross	122	.....	.....	.....	65
Famous B-10.	3000	1690	Cont	3½x5	19.6	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x4	Ross	120	Mon	Bim	.....	75
Federal SD.	3600	2300	Cont	3¾x5	22.5	L	C	T	F	Zen	V	Eis	...	B	Own	3	A	Pet	W	Timk	6.2:1	20.6:1	Math	35x5*	36x6*	Gem	132	Phar	Det	Det	71
Ford T.	1450	550	Own	3¾x4	22.5	L	T	T	S	Own	G	Mag	...	D	Plan	2	U	Own	W	½-Fl	7.25:1	.....	.....	30x3½*	32x4½*	.....	124	.....	Smi	.....	....
Forschler A.	3450	2100	Cont	3½x5	19.6	L	C	Own	B	Zen	..	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x3	36x4	Ross	120	Dup	.....	.....	....
Gary F.	3200	1900	Buda	3¾x5	22.5	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.2:1	21.6:1	S-El	36x3½	36x4	Lav	130	Pier	Pru	Gdy	....
Giant 15.	2950	1950	Cont	3¾x5	22.5	L	T	Idl	B	Sheb	G	Eis	...	W	B-Li	3	U	Spic	W	Shel	7.8:1	.....	Math	34x3½	34x5	Ross	138	.....	Wan	.....	94
Higrade A18.	2900	2100	Cont	3½x5	19.6	L	T	Per	B	Zen	V	Sim	E	F	Full	3	U	Bld	W	Shel	7.75:1	22.75:1	Per	35x5	35x5	Lav	115	Dup	Det	Fir	66
Hoover 15B.	2425	1625	Cont	3½x5	19.6	L	P	Can	F	Sheb	V	Dix	...	F	Full	3	U	Acme	W	Shel	6.2:1	18.6:1	Shel	32x4	33x4½	Lav	120	.....	E&O	Fir	80
Indepen't B, Dav'n't, Ia.	2900	1550	Cont	3½x5	19.6	L	T	C	F	Strm	V	Bos	...	F	Full	3	U	Bld	C	Dead	8.2:1	.....	GC	34x4½*	36x6*	Lav	132	.....	Pru	Fir	75
Indepen't F, Y'ngst'n, O.	3400	....	Cont	3¾x5	22.5	L	P	C	C	Sheb	G	Eis	...	F	Full	3	U	Ster	W	Wis	8.25;1	33:1	S-El	36x3½	36x5	Ross	140	Pier	.....	.....	....
International F.	3000	1850	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	8:1	26.5:1	.....	36x3½	36x4	Own	128	Own	Own	Fir	50
Jones 31A.	3400	1495	Cont	3½x5	19.6	L	P	C	F	Strm	G	Eis	...	B	GLee	3	U	Arv	I	Russ	8.33:1	22.5:1	Cham	34x3½	34x4	CAS	130	Pier	Pru	Fir	80
Kleiber AA.	....	2400	Cont	3¾x5¼	22.5	..	..	.....	..	Strm	G	Bos	...	..	B-Li	..	A	.....	W	.....	7:1	23.52:1	.....	34x3½	34x5	Ross	130	.....	W&L	.....	....
Maccar S.	3600	2400	Cont	3¾x5	22.5	...	C	Own	...	Strm	...	Eis	...	L	B-Li	3	....	Spic	W	Timk	.....	.....	Mer	34x3½*	35x5*	Ross	135	....	Sch	.....	....
Menominee HT.	....	2080	Cont	3¾x5	22.5	L	T	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	7:1	23.3:1	Tut	34x3½	34x5	Ross	130	Mon	Stn	Fir	80
Myers 60.	2850	1545	Lyco	3½x5	19.6	L	T	C	B	Zen	G	Swi	...	D	MM	3	U	UM	W	Chic	7.5:1	30.:1	C-C	34x3½	34x4	CAS	130	.....	E&O	.....	75
Napoleon 9.	3200	1385	Vict	3½x5	19.6	O	T	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	6:1	18:1	.....	35x5*	35x5*	Lav	133	.....	.....	Fir	65
Nash 2018.	3400	1650	Own	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	B	Selec	3	U	Own	I	Celf	6.83:1	21.85:1	.....	34x3	34x4	Jac	130	Simp	AuW	.....	67.5
Nelson & LeMoon F1.	2900	2250	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x5	Lav	....	Pier	Pru	Gdy	80
Noble A20.	3200	....	Buda	3¾x5¼	22.5	...	C	T	...	Zen	G	Eis	...	F	Full	3	U	.....	...	Shel	7.8:1	7.75:1	S-El	36x3½	36x4	Lav	148	Pier	Bim	.....	....
Norwalk.	1650	1595	Lyco	3½x5	22.5	L	T	C	S	Zen	...	Del	D	D	MM	3	....	UM	W	½-Fl	.....	.....	C-C	34x4*	34x4	CAS	130	....	.....	.....	90
Ogden A1.	3400	2095	Cont	3¾x5	22.5	L	T	T	B	Rayf	G	Bos	...	B	B-Li	3	U	Acme	W	Timk	7.75:1	11.18:1	Tut	36x3	36x4	Gem	136	Pier	Stn	.....	70
Old Hickory.	3470	2175	Cont	3¾x5	22.5	L	T	T	F	Strm	V	Mag	...	B	Selec	3	U	Bld	W	½-Fl	7.75:1	23.1:1	S-El	36x3½	36x4	W	135	Pier	Stn	Fir	75
Patriot Revere.	2800	1875	Cont	3¾x5	22.5	L	T	C	S	Strm	V	AtK	B	B	Covt	3	A	Ther	W	Emp	6:1	21.72:1	S-El	35x5	35x5*	W	128	Q	.....	Gdy	60
Piedmont O.	....	....	Lyco	3½x5	19.6	L	T	Stan	F	Cart	...	Bat	D	B	Selec	3	....	Hart	W	Emp	.....	.....	S-El	33x4*	33x4	.....	130	....	.....	.....	....
Pioneer B.	....	1590	Cont	3½x5	19.6	..	T	.....	..	Strm	...	Bos	...	..	B-Li	3	....	.....	W	Timk	.....	.....	.....	36x3	36x4	.....	132	.....	.....	.....	....
Rainier R-9.	2800	1875	Cont	3½x5	19.6	L	T	Har	B	Zen	...	Sim	...	D	B-Li	3	....	Hart	W	Shel	.....	.....	Per	32x3	32x4	Lav	125	Mon	Sch	.....	80
Republic 10.	2975	1595	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	D	Full	3	U	Arv	I	Torb	7:1	20.9:1	S-El	34x3	34x4	Jac	124	Rug	Pru	Fir	....
Royal.	....	2400	Wis	3¼x5	16.9	...	C	T	...	Strm	...	Bos	Q	B	Own	3	....	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	Mon	.....	.....	....
Sandow G.	3000	1895	Cont	3½x5	19.6	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	120	.....	Stn	.....	70
Service 220.	3470	2245	Buda	3½x5⅛	19.6	L	T	T	B	Strm	V	Eis	...	D	Selec	3	U	Arv	W	Timk	7.75:1	23.2:1	.....	34x3½	34x5	Ross	137	.....	Bim	.....	65
Signal F.	4395	2400	Cont	4⅛x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	4:1	Det	34x3½	36x5	Ross	144	Pier	Hay	Gdy	75
Standard 56.	3400	2250	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Eis	D	...	B-Li	4	U	Spic	W	Timk	7.2:1	24:1	.....	34x3½	34x4	Ross	134	Mon	.....	.....	75
Stewart 8.	2820	1650	Cont	3½x5	19.6		T	T	B	Zen	G	Eis	...	B	Durst	3	U	Hart	I	Cl	6.8:1	21:1	Det	34x3½	34x4	Gem	130	.....	Wan	Fir	70
Superior D.	2950	1600	Cont	3¾x5	19.6	L	T	Idl	B	Strm	V	Eis	...	F	Full	3	U	Arv	I	Torb	7:1	20.7:1	Tut	34x4½*	34x4	CAS	124	Pier	Sch	Fir	75
Transport 20.	3070	1750	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	F	Full	3	U	Ther	I	Cl	7.25:1	21.75:1	Det	34x3½	34x4	Jac	130	Simp	.....	Fir	70
Vim 25.	3700	2195	Her	3¾x5⅛	22.5	L	G	McC	F	Zen	G	Dix	...	L	B-Li	3	U	Spic	W	Shel	6.5:1	.....	Shel	35x5*	35x5*	Jac	125	.....	Hoo	Fir	....

1¼ Ton

1¼ Ton

Garford 25.	3900	2090	Buda	3¾x5½	22.5	L	C	T	S	Strm	G	Spl	...	L	.....	3	....	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	.....	.....	72
Kissel Delivery.	2950	1875	Own	3⅞x5½	24.1	L	C	McC	S	Strm	V	Eis	...	W	Warn	3	U	Spic	B	Own	5:1	18.3:1	Math	34x4½*	34x4½*	Jac	135	Pier	Pru	Fir	80
Koehler C.	3300	1885	H-Sp	3½x5	19.6	L	T	T	P	Zen	G	Eis	...	D	MM	3	U	Spic	I	Torb	7:1	23:1	Math	34x3	34x5	Own	132	Simp	Wan	SAE	75
Oneida A9.	....	1985	Own	3¾x5	22.5	L	C	.....	P	.....	...	Mag	...	..	Own	3	U	.....	...	Own	.....	.....	S-El	36x3½	36x5	.....	135	Own	.....	.....	....
Triangle AA.	2500	....	Her	3¼x5	16.9	L	T	Per	B	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	6:1	18:1	Det	35x5	35x5*	Gem	115	.....	Hay	.....	60

1½ Ton

1½ Ton

Acason RB.	3850	2300	Wau	3¾x5¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	U	Bld	W	Timk	9.25:1	37:1	Det	36x3½	36x6	Ross	142	Wau	Bim	.....	77
Ace.	4600	....	Buda	3¾x5⅛	22.5	L	T	Spi	F	Sheb	G	AtK	W	M	Cott	3	A	Spic	W	Timk	7:1	.....	Math	34x4	34x6	Ross	144	Pier	Sch	.....	80
Acme F.	....	2275	Cont	3¾x5	22.5	L	T	GO..	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	8.75:1	35:1	Det	34x3½	34x5	Ross	141	Dup	Bim	.....	80
Apex D.	3070	1595	Buda	3½x5⅛	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	8:1	24:1	Det	32x3½	32x4	Lav	130	.....	.....	Fir	70
Atterbury 7R.	4770	2575	Cont	4⅛x5¼	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	8.5:1	34:1	SP	36x3½	36x5	Gem	140	Mon	Arc	Fir	96.5
Beck-Hawkeye B.	3200	1950	Cont	3¾x5	22.5	L	T	H	S	Strm	G	Bos	...	F	Full	3	U	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	36x6	Lav	144	Pier	.....	.....	75
Belmont B.	3200	1950	Buda	3¾x5¼	25.6	L	P	GO	P	Zen	V	Eis	...	D	Selec	3	U	Ster	I	Russ	7.7:1	23:1	S-El	34x4½*	34x5	Lav	139	Pier	E&O	Stn	75
Bessemer H2.	3650	2085	Cont	3¾x5	22.5	L	T	C	B	Zen	...	Bos	...	B	B-Li	3	....	Arv	I	Torb	.....	.....	Ter	36x3½	36x5	Ross	144	.....	.....	.....	63
Bethlehem D.	3300	1965	Own	3¾x4½	22.5	L	T	Fed	B	Sheb	G	Bat	G	B	Det	3	U	UP	I	Russ	8.2:1	26.2:1	Shel	34x3½	34x5	Lav	136	Mon	Wan	Fir	85
Brockway S2.	3550	2100	Cont	3¾x5	22.5	L	T	Bus	B	Strm	V	Eis	...	L	B-Li	3	U	Spic	W	Shel	7.8:1	26:1	Mer	36x3½	35x5	Gem	140	Opt	Hoo	.....	70
Chicago C1½.	3800	2600	Her	3¾x5⅛	22.5	L	..	T	F	Strm	G	Bos	...	L	B-Li	3	U	Peters	W	Timk	7.25:1	25.8:1	Math	36x3½	36x5	Gem	144	Simp	Q	Stn	....
Clydesdale 42.	3750	2445	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23:1	Stan	36x3½	36x6	Ross	146	Own	.....	.....	72
Collier 19.	4000	1850	Cont	.....	22.5	..	..	.....	..	.....	...	.....	...	..	.....	..	.....	.....	..	Own	.....	.....	.....	36x4	36x6	.....	144	.....	.....	.....	....
Comet 1½.	2898	1750	Lyco	3½x5	19.6	L	T	Stan	B	Cart	G	Del	D	B	Munc	3	U	UP	W	Stan	.....	.....	Mar	34x4*	34x4	CAS	130	.....	.....	Fir	85
Commerce EP.	3300	1965	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	U	Spic	I	Torb	7:1	22.9:1	Det	36x6*	36x6*	Jac	134	.....	Bim	Fir	80
Concord A.	4200	2700	Buda	3¾x5½	22.5	L	C	T	S	Zen	...	Eis	...	L	B-Li	3	....	Spic	W	Timk	.....	.....	Per	36x3½	36x5	Ross	140	Mon	.....	.....	70
Corbitt D.	3960	2600	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	D	...	B-Li	3	U	Hart	W	Shel	8.66:1	26:1	Shel	36x3½	36x5	Ross	140	Simp	Bim	Fir	75
Dart S.	3300	2250	Buda	3¾x5⅛	22.5	L	T	C	T	Zen	V	Eis	...	F	Full	3	U	Spic	W	Own	7:1	20.3:1	Per	34x3½	34x6	Ross	140	Pier	Pru	.....	80
Day-Elder B.	3650	2200	Cont	3¾x5	22.5	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	9.33:1	34.1:1	Shel	34x3½	34x5	Ross	144	.....	Jon	Stn	72
Dearborn F.	3280	1980	Cont	3½x5	19.6	L	T	T	S	Strm	V	Bos	...	F	Full	3	U	Arv	W	Stan	7.75:1	23.25:1	Tut	34x4	34x5	Lav	126	.....	.....	.....	80

1½ Ton—Continued

1½ Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Defiance B.	3200	1795	Cont	3¾x5	22.5	L	T	Per	B	Strm	...	Eis	...	B	GLee	3	....	Arv	I	Torb	.....	.....	Det	34x3½	34x5	Dit	135	Mon	.....	.....	85
Diamond T-Farm Spec.-T.	5100	2295	.....	3¾x5¼	22.5	L	C	T	B	Strm	G	Bos	...	...	Selec	3	U	Ther	W	Timk	7.75:1	26.04:1	Math	36x3½	36x5	.....	144	....	.....	.....	....
Diamond T-J4.	3925	2755	.....	3¾x5	22.5	L	T	T	B	Strm	G	Bos	...	...	.....	3	U	Spic	W	.....	7.75:1	25.8:1	Math	36x3½	36x5	.....	154	Pier	.....	.....	....
Douglas D.	3100	2100	Buda	4⅛x5½	27.2	L	C	Own	B	Sheb	...	Eis	...	F	Full	3	....	Arv	I	Torb	.....	.....	Own	34x3½	34x5	Ross	127	Pier	.....	.....	65
Erie 1½.	4700	....	Buda	3¾x5	22.5	L	T	McC	B	Strm	V	Bos	...	D	Full	4	....	Sher	W	Shel	.....	.....	Per	34x3½	36x5	Ross	144	Pier	.....	.....	80
Fageol 1½.	3500	....	Lyco	3½x5	19.6	L	C	Spi	S	Till	G	.....	...	B	Selec	5	U	Spic	W	Stan	5.63:1	59.7:1	Math	34x3½	34x6	Ross	136	.....	Pru	.....	80
Famous B-12.	3600	2095	Cont	3¾x5	22.5	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x5	Ross	138	Mon	Bim	.....	75
Federal TE.	4250	2500	Cont	4⅛x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	8.5:1	37.4:1	Math	36x3½	36x5	Gem	144	Phar	Sch	Fir	68.5
Forschler A-X.	3670	2375	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x3½	36x6	Ross	120	Dup	Smi	.....	....
Gary GT.	3800	2250	Buda	4 x5½	25.6	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.25:1	21.75:1	S-El	36x3½	36x5	Ross	144	Pier	Pru	Gdy	....
Gersix M.	4300	2650	Buda	4 x5½	25.6	L	C	I	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	7.75:1	31:1	Tut	36x3½	36x6	Ross	142	Mon	Jon	.....	70
Giant 14.	3600	2250	Cont	3¾x5	22.5	L	T	C	B	Sheb	G	Eis	...	W	B-Li	3	U	Spic	W	Shel	7.8:1	.....	Math	34x3½	34x5	Jac	144	Pier	Wan	.....	94
G.M.C. 31A.	4205	2500	Cont	3¾x5	22.5	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	130	Mon	.....	SAE	74
G.M.C. 31B.	4245	2500	Cont	3¾x5	22.5	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	144	Mon	.....	SAE	74
Gramm-Bernstein 15..	3800	1995	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Selec	3	U	Own	I	Cl	7.22:1	21.6:1	.....	36x3½	36x5	Ross	138	.....	.....	Fir	90.5
Gramm-Bernstein 65 .	4200	2500	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Own	3	A	Own	W	Stan	7.22:1	26:1	.....	36x3½	36x5	Ross	138	.....	.....	Fir	90.5
Grant 10.	3000	1885	Cont	3¾x5	22.5	L	T	Fed	B	Gart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	7:1	.....	Per	34x4½*	34x5	Jac	124	.....	Bim	Fir	65
Grant 11.	3100	1935	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	7:1	.....	Per	34x4½*	34x5	Jac	140	Pier	Bim	Fir	67
Hahn CD.	4200	.....	.....	4½x5	27.2	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Timk	.....	.....	.....	36x3½	36x5	Ross	130	Pier	.....	.....	65
Harvey WEA.	3850	2350	Buda	4½x5½	27.2	L	P	T	F	Zen	G	Bos	...	F	Full	3	U	Arv	W	Shel	7.75:1	23.25:1	Shel	34x3½	34x5	Ross	128	Mon	StM	.....	60
Hawkeye K.	3750	1995	Buda	3¾x5½	22.5	L	C	C	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	34x3½	34x5	Ross	148	Simp	Bim	Fir	70
Higrade B 20.	3300	2500	.....	4½x5	26	L	P	Per	B	Zen	V	Eis	E	F	Full	3	U	Bld	W	Shel	7.75:1	31:1	Per	36x6	36x6	Lav	130	.....	Det	Fir	66
Huffman B.	3200	1895	Cont	3¾x5	22.5	...	T	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Stan	8.67:1	8:1	Per	34x3½	34x6	Lav	140	.....	Roy	Fir	85
Huffman C.	3350	1695	Buda	3¾x5½	22.5	...	T	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Torb	12.17:1	11.5:1	Per	34x3½	34x6	Lav	140	.....	Roy	Fir	85
Hurlburt.	4300	2850	Buda	4 x5½	25.6	L	C	T	S	Flch	G	Eis	...	D	B-Li	3	U	Spec	W	Flot	7.75:1	31:1	Per	34x4	34x5	Ross	148	Dup	Wan	.....	....
Indepen't E, Dav'n't, Ia.	3550	1890	Cont	3¾x5	22.5	L	C	C	B	Strm	V	Bos	...	F	Full	3	U	Bld	C	Dead	8.2:1	.....	GC	35x5*	38x7*	Lav	135	.....	Pru	Fir	75
Indiana 20.	5300	2950	Own	4⅛x5½	27.2	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Acme	W	½-Fl	7.75:1	31:1	S-El	36x4	36x7	Wohl	150	Pier	Bim	.....	68.5
International K.	3400	2200	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	4	A	Own	I	Own	9:1	43.5:1	.....	36x3½	36x5	Own	128	Own	Own	Fir	50
Jumbo 15.	....	2595	Buda	3¾x5¼	22.5	...	P	Own	...	Zen	...	N E	...	F	Full	3	....	Arv	I	Cl	.....	.....	Per	36x3½	36x5	Jac	144	.....	.....	.....	....
Kalamazoo G.	4450	2600	Cont	3¾x5	22.5	L	T	Hvn	B	Strm	V	Con	D	F	Full	4	A	Acme	W	Wis	8.5:1	41:1	Shel	34x4	34x5	Ross	144	Pier	Bim	.....	....
Kelly-Springfield K31.	4590	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kelly-Springfield K32.	4685	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	½-Fl	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kimball A.	....	.....	Wis	4 x6	25.6	L	C	Flex	B	Mas	V	Bos	...	L	B-Li	4	A	Spic	W	Shel	6.5:1	26:1	US	36x3½	36x5	Lav	126	Dup	Wes	.....	80
Kissel Utility.	3890	2275	Own	3 7/16x5½	24.1	L	C	McC	S	Strm	V	Eis	...	W	Warn	3	U	Spic	W	Shel	7.8:1	28.5:1	Math	36x3½	36x5	Jac	152	Pier	Pru	.....	80
Kleiber A.	....	2800	Cont	4½x5¼	27.2	...	..	.....	...	Strm	G	Bos	...	...	B-Li	...	A	.....	W	.....	7:1	28:1	.....	36x3½	36x6	Ross	143	.....	W&L	.....	....
Larrabee-Deyo U.	3600	2250	Cont	3¾x5	22.5	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	3	U	M	W	Shel	7.66:1	25.5:1	Mer	34x3½	34x5	Ross	138	Pier	Hoo	.....	....
Maccar L.	4300	2750	Cont	4½x5¼	27.2	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.52:1	Mer	36x4	36x5	Ross	150	Pier	Sch	Gdy	70
Mack AB	4800	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Bld	C	Dead	6.99:1	28.01:1	Mer	36x4	36x3½†	Gem	144	Own	Sch	.....	68
Mack AB.	4900	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Spic	W	Timk	8.50:1	34.09:1	Mer	36x4	36x3½†	Gem	144	Own	Sch	.....	68
Master Junior JW.	3800	2290	Buda	4½x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Arv	W	Timk	7.75:1	23.25:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Master Junior JI.	3900	2190	Buda	4½x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Arv	I	Torb	8:1	24:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Maxwell.	2385	1185	Own	3⅝x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	32x3	32x4	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1205	Own	3⅝x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	32x3	32x4	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1225	Own	3⅝x4¼	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	34x4½*	34x4½*	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1287	Own	3⅝x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	34x4½*	34x5	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1350	Own	3⅝x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	35x5	35x5	Own	124	.....	Kel	Fir	50
Menominee H.	....	2725	Cont	3¾x5¼	22.5	L	C	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	9.25:1	23.3:1	Tut	36x3½	36x5	Ross	144	Mon	Stn	Fir	80
Moreland 19B.	4150	2930	Cont	4½x5¼	27.2	L	C	C	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7:1	33.88:1	US	36x3½	36x5	Ross	126	.....	Smi	SAE	....
Myers 80.	3000	1875	Lyco	3½x5	19.6	L	T	C	S	Zen	G	Swi	...	B	GLee	3	U	UM	W	Chic	8.5:1	32:1	C-C	34x3½	34x5	CAS	144	.....	E&O	.....	75
Napoleon 11.	3450	1660	Vict	3½x5	19.6	O	T	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	8:1	24:1	S-El	35x5*	36x6*	Lav	133	.....	.....	Fir	65
Nelson & LeMoon F1½.	3400	2425	Cont	4½x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x6	Lav	...	Pier	Pru	Gdy	80
Noble B-30	4200	....	Buda	3¾x5¼	22.5	...	C	T	...	Strm	G	Eis	...	F	Full	3	U	.....	...	Shel	7.75:1	.....	S-El	36x3½	36x5	Lav	156	Pier	Bim	Q	....
Norwalk.	1850	1925	Lyco	3½x5	19.6	L	T	C	B	Zen	...	Del	...	B	GLee	3	....	UM	W	Stan	.....	.....	C-C	34x3½	34x5	CAS	130	.....	.....	.....	75
O.K. 1½ T.	....	2450	Buda	4½x5½	27.2	L	P	Own	B	Zen	...	Eis	...	F	Full	3	.....	.....	W	Wis	.....	.....	Tut	36x3½	36x5	Ross	146	Pier	.....	.....	....
Old Reliable A.	4150	2350	Wis	4 x5	25.6	L	C	T	B	Strm	V	Bos	Q	M	B-Li	3	U	Spic	W	Shel	7.75:1	26:1	Shel	34x3½	36x6	Ross	138	Pier	StM	.....	90
Oneida B9.	....	2385	Own	4	25.6	L	C	C	P	.....	...	Mag	...	...	Cwn	3	A	.....	...	Own	.....	.....	S-El	36x3½	36x6	.....	144	Own	.....	.....	....
Packard 1½E.	4670	3200	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	6.25:1	28.7:1	.....	34x3½	34x3½†	Own	144	Own	.....	.....	46.2
Patriot Lincoln.	3900	2450	Hink	4 x5¾	25.6	L	T	Own	F	Strm	V	.....	...	D	Selec	4	A	Ther	W	Emp	7.25:1	34.8:1	S-El	34x3½	34x3½†	W	135	.....	.....	Gdy	75
Piedmont.	....	....	Lyco	3½x5	19.6	L	T	Stan	F	Cart	...	Bat	D	B	Selec	3	....	Hart	W	Emp	.....	.....	S-El	.....	.....	.....	140	.....	.....	.....	....
Pioneer N.	....	1990	Cont	3¾x5	22.5	...	C	.....	...	Strm	...	Bos	...	...	B-Li	3	.....	.....	W	Timk	.....	.....	.....	36x3½	36x5	.....	154	.....	.....	.....	....
Rainier R-6.	3100	1975	Cont	3½x5	19.6	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	7.8:1	25.97:1	Per	34x3	34x4	Lav	133	Mon	Sch	.....	80
Reliance A10.	4500	2500	Buda	4 x5½	25.6	L	C	H	B	Strm	G	Eis	...	F	Full	3	U	Peters	E	Badg	6.6:1	19.8:1	Shel	36x3½	36x5	Ross	150	Pier	Bim	Gdy	90
Republic 11X.	3365	1885	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	D	Full	3	U	Arv	I	Torb	8:1	23:1	S-El	34x3½	34x5	Jac	144	Rug	Pru	Fir	....
Reynolds 1½.	....	2875	.....	4x5¼	25.6	...	C	Cwn	F	Strm	...	Mag	...	...	Own	4	A	.....	W	Own	.....	.....	S-El	36x3½	36x6	Own	160	Hink	Smi	.....	....
Royal.	....	2800	Wis	3¾x5	22.5	...	C	T	...	Strm	...	Bos	Q	D	Own	...	....	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	.....	.....	.....	67
Sandow CG.	3300	2190	Cont	3¾x5	22.5	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	135	.....	Stn	.....	70
Schwartz.	3500	2175	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	34x3½	34x5	Ross	140	Pier	.....	.....	....
Schwartz B.	3500	2375	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	Hart	I	Torb	7.6:1	25.5:1	Row	36x6*	36x6*	Ross	140	Pier	Sch	.....	....
Selden 1½A.	3400	2240	Cont	3¾x5	22.5	L	T	Bus	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	.....	Per	34x3½	34x5	Lav	140	Pier	Arc	Gdy	70
Service 31.	4850	2785	Buda	4 x5½	25.6	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x3½	36x6	Ross	150	Simp	Bim	.....	65
Service 36.	4900	3215	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	6.8:1	32.9:1	.....	35x5*	38x7*	Ross	150	Simp	Bim	.....	65
Signal H.	4675	2700	Cont	4½x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	4:1	Det	34x4	36x6	Ross	144	Pier	Hay	Gdy	75
Sterling 1½.	4720	2480	Ster	4 x5¾	25.6	L	C	Own	C	Rayf	V	Eis	...	L	B-Li	4	U	Spic	W	Timk	7:1	28:1	Math	36x3½	36x5	Ross	142	Wau	Wan	.....	91

Stewart 9	3440	1975	Cont	3¾x5	22.5	L	T	T	B	Zen	G	Eis	...	F	Fu	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	34x3½	34x5†	Gem	140	.....	Wan	Fir	70
Stoughton B	.....	.....	.....	3¾x5¼	22.5	...	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x3½	36x5	.....	140	.....	Own	Gdy	...
Sullivan F	3500	2350	Buda	3¾x4½	22.5	L	T	V	I	Strm	G	Bos	...	H	Covt	3	A	Hart	W	Timk	8.50:1	31:1	Mer	36x3½	36x5	Ross	129	.....	Wan	.....	60
Texan TK39	3200	1425	Lyco	3½x5	19.6	L	T	H	B	Cart	G	Del	D	B	Munc	3	U	UP	W	½-Fl	7.75:1	20.15:1	S-El	34x4	34x4	CAS	130	.....	.....	Fir	60
Tiffin GW	3750	2300	Cont	4⅛x5¼	27.2	L	C	V	B	Sheb	G	Bos	...	F	Full	3	U	Hart	W	Shel	7.75:1	23.25:1	Kal	36x3½	36x5	Ross	129	Pier	Smi	.....	...
Tower J1½	3400	2600	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	...	Bos	...	F	Full	3	.....	Spic	W	Timk	.....	.....	Det	35x5*	38x7*	Ross	142	Pier	.....	.....	70
Transport 30	3450	2050	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	F	Full	3	U	Arv	I	Cl	7.6:1	22.8:1	Det	36x3½	36x5	Jac	140	Simp	.....	Fir	70
Triangle A	3750	2185	Wau	3¾x5¼	22.5	L	C	Per	L	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	6.83:1	21:1	Det	34x3½	34x6	Gem	144	Wau	Roy	Fir	60
Triumph H	3650	2450	Buda	3¾x5¼	22.5	...	C	H	F	Pent	V	Dix	...	B	Cott	3	U	Hart	...	Russ	.....	8:1	S-El	36x3½	36x6	Lav	144	Pier	Stn	Stn	70
United A	....	2100	Buda	3¾x5½	22.5	L	C	V	F	.....	G	Eis	Q	L	B-Li	3	U	Bld	I	Cl	7:1	.....	.....	34x3½	34x5	Ross	Q	Simp	Pru	Fir	80
U.S.N	3800	2150	Cont	3¾x5	22.5	L	C	T	S	Strm	V	Eis	Q	D	B-Li	3	U	Opt	I	Cel	7.6:1	25.3:1	Shel	36x3½	36x5	Lav	144	Mon	Sch	.....	80
Velie 46	3650	1925	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Bos	...	B	Durst	3	U	Arv	I	Torb	8:1	31.2:1	Math	36x3½	36x5	Gem	133	Mon	Bim	Gdy	80
White Hickory H	3975	2475	Cont	3¾x5	22.5	L	C	T	B	Strm	V	Eis	...	F	Full	3	U	Arv	W	Timk	8.5:1	25.5:1	Shel	36x3½	36x5	Ross	144	Simp	Bim	Fir	76
Wichita L	3600	2350	Own	3½x5	19.6	L	T	Per	S	Strm	G	Bos	...	C	Covt	3	A	Own	W	Shel	7.75:1	3.65:1	.....	36x3½	36x5	Ross	144	.....	Bim	Fir	....
Wilson F	3800	2450	Cont	3¾x5	22.5	L	C	T	B	Mar	G	Eis	...	B	B-Li	4	A	Ther	W	Timk	6:1	24:1	Perf	36x5½	35x5	Ross	136	Pier	.....	.....	75
Winther 39	3700	2325	Wis	3¾x5	22.5	L	P	T	G	Strm	G	Eis	B	F	Full	3	U	Arv	I	Cl	7:1	21:1	Har	34x3½	34x5	Lav	140	.....	.....	Fir	70
Winther 430	4100	2575	Wis	3¾x5	22.5	L	P	T	G	Strm	G	Eis	...	F	Full	3	U	Arv	I	Cl	9:1	36:1	Har	32x4	32x4	Lav	132	.....	.....	Fir	70
Witt-Will W-DT19	3550	2000	Cont	3¾x5¼	22.5	O	G	C	B	Zen	G	Eis	...	D	Selec	3	U	Spic	W	Timk	6:1	25:1	S-El	36x3	36x4	Ross	120	Pier	Arc	SAE	67
Wolverine C	3400	2380	Cont	3¾x5	22.5	L	T	L	B	Strm	G	Mag	G	F	Selec	3	U	UP	I	Russ	8.2:1	32.8:1	Tut	34x3½	34x5	Gem	140	Mon	Hay	Gdy	77

2 Ton

Acme A	4450	2875	Cont	4¼x5¼	27.2	L	C	GO	B	Rayf	V	Eis	...	B	Cott	4	U	Bld	W	Timk	8.5:1	44:1	Det	36x4	36x7	Ross	148	Dup	Bim	.....	80
Autocar F	3430	2300	Own 2	4¾x4½	18	L	C	V	S	Strm	G	Mag	...	D	Prog	3	A	.....	R	Flot	8.3:1	33.2:1	.....	34x4	34x5	Own	97	.....	Hoo	.....	65
Autocar G	3690	2400	Own 2	4¾x4½	18	L	C	V	S	Strm	G	Mag	...	D	Prog	3	A	.....	R	Flot	8.3:1	33.2:1	.....	34x4	34x5	Own	120	.....	Hoo	.....	65
Available H2	4700	....	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Tut	36x4	36x7	Ross	152	Pier	Sch	.....	75
Beck Hawkeye C	4000	2350	Cont	4⅛x5¼	27.2	L	P	H	F	Strm	G	Bos	...	F	Full	3	U	Bld	I	Cl	9:1	2:1	Hig	36x4	36x7	Lav	144	Pier	Hay	Fir	70
Belmont C	4300	2550	Buda	4¼x5½	28.9	L	P	GO	P	Zen	V	Eis	...	D	Selec	3	U	Ster	I	Russ	8:1	24:1	S-El	36x4	36x7	Lav	150	Pier	E&O	Stn	75
Collier 20	....	2150	.....	.....	22.5	...	..	.....	B	.....	...	.....	...	...	.....	...	.....	.....	W	Own	.....	.....	.....	.....	.....	.....	152	.....	.....	.....	....
Columbia E	4100	2350	Cont	4¼x5¼	27.2	L	C	T	F	Shk	G	Dix	...	C	Covt	3	A	Spic	I	Russ	9.50:1	34.5:1	Per	36x4	36x6	Own	144	Pier	StM	Fir	80
Conestoga 30	4000	2700	Cont	3¾x5	22.5	L	C	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	9.66:1	29:1	S-El	36x4	36x4†	Ross	138	....	E&O	Stn	80
Corbitt C	4800	3250	Cont	4½x5¼	27.2	L	C	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	8.75:1	29.4:1	Shel	36x3½	36x7	Ross	148	Simp	Bim	Fir	75
Day-Elder D	4300	2600	Cont	4½x5¼	27.2	L	P	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	9.67:1	35 4:1	Shel	36x4	36x6	Ross	144	Mon	Jon	Stn	72
Dearborn BW	3000	2250	Buda	3⅝x5⅛	19.6	L	T	T	S	Strm	V	Bos	...	B	GLee	3	U	Hart	W	Stan	7.75:1	23.8:1	S-El	32x4*	34x5	Dit	133	.....	.....	.....	90
Dearborn 48	3500	2390	Buda	3¾x5⅛	19.6	L	T	T	B	Strm	V	Bos	...	F	Full	3	C	Hart	W	Stan	8.66:1	29.5:1	S-El	34x4½*	34x7	.....	148	.....	.....	.....	85
Defiance C	3500	1995	Cont	3¾x5	22.5	L	T	Per	B	Strm	...	Eis	...	B	GLee	3	....	Arv	I	Torb	.....	.....	Det	34x3½	34x6	Dit	135	Mon	.....	.....	85
De Kalb E2	4150	2100	Cont	4⅛x5¼	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Timk	8.5:1	28:1	Math	34x3½	34x6	Ross	146	.....	Hay	.....	68
Denby 134	3800	2450	Cont	3¾x5	22.5	L	T	L	S	Strm	G	Eis	...	F	Full	4	U	UP	I	Russ	10.2:1	49:1	Det	36x3½	36x6	Gem	144	Mon	Hay	.....	75.5
Diamond T-J3	4335	3185	.....	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	...	.....	3	U	Spic	W	.....	7.75:1	26.04:1	Math	36x4	36x7	.....	154	Pier	.....	.....	.....
Dorris K-4	5050	3285	Own	4¼x5½	28.9	O	W	T	F	Strm	G	Bos	...	D	Warn	4	A	Spic	W	Timk	7.75:1	38.67:1	Row	36x4	36x7	Ross	162	Own	Smi	.....	70
Erie 2	5100	....	Buda	4¼x5½	28.9	L	C	McC	B	Strm	...	Bos	...	D	Full	4	.....	Spic	W	Shel	.....	.....	Per	34x3½	36x5	Ross	150	Pier	.....	.....	80
Evans C-I	4400	2800	Cont	4⅛x5¼	27.2	L	G	T	B	Strm	...	Berl	D	D	.....	4	.....	Acm	I	.....	7:1	40:1	.....	36x4	36x8	Lav	168	Mon	Smi	Stn	82
Fargo P	3900	2200	Cont	3¾x5	22.5	L	T	Own	S	Rayf	G	Bos	...	D	Full	4	U	Spic	I	Russ	9.5:1	.....	Shel	36x4	36x6	Jac	144	.....	.....	.....	80
Federal UE	4800	2800	Cont	4½x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	156	Phar	Sch	Fir	71.5
Forschler B	4425	2750	Cont	4⅛x5¼	27.2	L	C	O	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x4	36x7	Ross	137	Dup	Smi	.....	....
Fulton C	3300	2350	H-Sp	3¼x5	16.9	L	T	GO	B	Cart	C	Sim	...	B	Durst	3	....	UP	I	Russ	.....	.....	S-El	34x4	34x6	Lav	137	.....	.....	.....	68
Gabriel E	5000	3250	Buda	4¼x5½	28.9	L	C	T	F	Rayf	G	Bos	L	B	B-Li	4	A	Spic	W	Timk	8.5:1	1:1	Mer	35x5	36x7	Gem	156	Dup	Smi	Fir	65
Garford 70H	4590	3190	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Spl	...	W	Selec	4	A	Spic	W	Timk	1:1	.....	Per	36x4	36x7	Ross	144	Simp	.....	.....	.....
Giant 16	4500	2850	Cont	4¼x5¼	27.2	L	C	C	B	Sheb	G	Eis	...	W	B-Li	3	U	Spic	W	Shel	8.66:1	.....	Math	36x4	36x7	Ross	144	Pier	Wan	.....	90
G.M.C. 41A	4855	2950	Cont	4¼x5¼	27.2	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	144	Mon	Own	SAE	74
G.M.C. 41B	4910	2950	Cont	4¼x5½	27.2	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	158	Mon	Own	SAE	74
Gramm-Bernstein 20	4700	2900	Cont	4¼x5¼	27.2	L	C	T	S	Strm	G	NE	...	D	Own	4	A	Own	W	Shel	7.75:1	28:1	.....	36x4	36x7	Ross	144	Pier	.....	Fir	91
Grant 15	3400	2150	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	124	Pier	Bim	.....	67
Grant 16	3500	2250	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	149	Pier	Bim	.....	70
Hahn DE	4800	....	.....	4⅛	27.2	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Shel	.....	.....	.....	36x4	36x6	Ross	142	Pier	.....	.....	....
Hall	4560	2875	Cont	4⅛x5¼	27.2	L	P	H	B	Zen	G	Bos	...	L	B-Li	..	U	K-B	W	Timk	7.75:1	.....	Det	36x4	36x8	Gem	Q	Dup	Smi	.....	....
Hawkeye M	4500	2650	Buda	4¼x5½	28.9	L	C	C	B	Zen	G	Eis	...	F	Full	4	U	Hart	I	Cl	9:1	43.2:1	Det	36x4	36x6	Ross	148	Simp	Bim	Fir	70
Hewitt-Ludlow	4200	2950	Buda	4⅛x5½	27.2	...	..	T	...	Strm	...	Bos	...	B	Cott	..	...	Spic	W	Wis	.....	.....	.....	36x4	36x6	Ross	140	.....	.....	.....	....
H & M 2	3400	2250	Her	3½x5	29.5	...	T	GO	B	Cart	G	Bos	D	F	Full	4	U	Ther	I	Torb	Opt	Opt	Math	36x6*	38x7*	Lav	144	.....	.....	Fir	75
Hurlburt	5600	3750	Buda	4¼x5½	28.9	L	C	T	B	Flch	G	Eis	...	D	B-Li	3	U	Spic	W	Flot	8.66:1	29.09:1	Per	36x4	36x4†	Ross	148	Dup	Wan	.....	....
Indepen't F, Dav'n't, Ia	4500	2290	Cont	4¼x5¼	27.2	L	C	C	B	Strm	V	Bos	...	F	Full	4	U	Bld	C	Dead	10.2:1	.....	.....	G-C	36x6*	40x8*	Lav	146	.....	Pru	Fir	75
Indepen't K, Y'ngst'n, O	5400	...	Cont	4½x5½	32.4	L	P	C	T	Sleb	G	Eis	...	F	Full	4	U	Spic	W	Wis	10:1	48:1	S-El	36x5	36x10	Ross	160	Pier	.....	.....	70
Indiana 25	5500	3150	Own	4⅞x5½	27.2	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Acme	W	½-Fl	7.75:1	37.5:1	S-El	36x4	36x8	Wohl	156	Pier	Bim	.....	71.5
International G	4010	2600	Own	4 x5	25.6	O	T	Own	B	Ens	V	Eix	O	D	Own	4	A	Own	I	Own	9:1	43.5:1	.....	36x4	36x6	Own	138	Own	Own	Fir	50
Jumbo 20	....	2795	Buda	3¾x5¼	22.5	...	P	Own	T	Zen	...	N E	...	F	Full	3	....	Arv	I	Cl	.....	.....	Per	35x5*	38x7*	Jac	144	.....	.....	.....	....
Kalamazoo H	5350	3200	Cont 6	3½x5¼	29.4	L	P	Hvn	B	Strm	V	Bos	D	B	Full	4	A	Acme	W	Wis	8.75:1	40.8:1	Shel	34x4	36x7	Ross	160	Pier	Bim	.....	....
Keldon 19	5100	2885	Buda	4¼x5½	28.9	L	C	Eur	F	Strm	G	Eis	...	F	Full	4	U	Det	I	Russ	1.75:1	3.75:1	.....	36x4	36x7	Ross	144	Pier	Smi	Fir	80
King Zeitler	4600	2950	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Ther	W	Timk	7.75:1	37:1	Tut	36x4	36x7	Lav	150	.....	StM	SAE	80
Kissel Freighter	4910	2975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Timk	8.5:1	42.5:1	Math	36x4	36x7	Lav	168	Pier	Pru	.....	80
Kleiber BB	....	3200	Cont	4¼x5¼	27.2	...	..	.....	...	Strm	G	Bos	...	..	B Li	..	A	.....	W	.....	8.66:1	31:1	.....	36x4	36x7	Ross	153	.....	W&L	.....	....
Lange B	5200	3000	Cont	4⅛x5¼	27.2	L	T	H	S	Strm	...	Bos	...	D	Cott	3	....	Hvn	C	Own	.....	.....	.....	36x4	36x6	Gem	136	Pier	.....	.....	90
Luedinghaus A	4300	2490	Wau	4¼x5¾	28.9	L	G	T	B	Sheb	...	Mag	...	G	Det	3	U	Spic	W	Chi	8.66:1	26.6:1	Tut	36x4	36x7	Lav	145	Wau	Own	SAE	80
Luverne BBL	....	1650	GBS	3¾x4¼	22.5	L	T	C	S	Sheb	G	Bos	D	D	Det	3	U	UP	I	Flot	8:1	30:1	Har	34x4*	34x5	Lav	136	.....	Own	Fir	....
Mack AB	4900	3300	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Bld	C	Dead	6.99:1	28.01:1	Mer	36x4	36x4†	Gem	144	Own	Sch	.....	71
Mack AB	5000	3300	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Spic	W	Timk	8.5:1	34.09:1	Mer	36x4	36x4†	Gem	144	Own	Sch	.....	71.5
Master M	4300	2590	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master O	4400	2690	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	170	McC	Pru	.....	76
Master T	4500	2850	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x4†	Ross	110	McC	Pru	.....	76
Master W	4500	2890	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	W	Timk	8.5:1	34:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master WL	4600	2990	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	W	Timk	8.5:1	34:1	Det	34x4	34x7	Ross	170	McC	Pru	.....	80
Menominee D	....	3245	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Eis	...	F	Full	4	U	Spic	W	Timk	9.25:1	40.08:1	Tut	36x4	36x4†	Ross	160	Mon	Stn	Fir	80
Muskegon 20	4015	2325	Cont	4⅛x5¼	27.2	L	C	M	B	Stew	V	Eis	...	F	Full	3	U	Hart	I	Torb	9:1	13.5:1	Per	36x4	36x6	Lav	144	Pier	Pru	.....	75
Nash 3018	3850	2250	Own	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Own	I	Celf	9:1	39.6:1	Math	34x4	34x6	Lav	144	Simp	AuW	.....	73.5
Nash Quad 4017	6250	3250	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	I-Cl	4	A	Spic	F	Own	8.5:1	42.3:1	Math	36x5	36x5	Lav	124	Simp	.....	.....	55
Nelson & LeMoon F2	4100	2775	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7.75:1	2:1	Tut	36x4	36x7	Lav	Q	Pier	Pru	Gdy	80
Netco D	5900	3000	Cont	4⅛x5¼	27.2	L	C	RT	S	Zen	G	Eis	...	L	B-Li	3	U	Hart	W	Timk	9.25:1	36:1	Pei	36x4	36x7	Ross	144	.....	Arc	SAE	80
Niles	....	....	Cont	.....	....	L	..	Hon	...	Strm	...	Eis	...	B	.....	3	....	Bld	...	Timk	.....	.....	S-El	36x4	36x7	Gem	...	Pier	.....	....	....

2 Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Noble C40	4500	....	Buda	4 x5½	25.6	...	C	T	...	Strm	G	Eis	...	F	Full	3	U	.....	...	Shel	7.75:1	.....	S-El	36x4	36x7	Lav	160	Pier	Bim	Q	....
Northway B2	6050	3250	Own	4 x6	25.6	O	C	GO	B	Sheb	V	Bat	W	F	Full	4	U	Spic	W	Shel	7.75:1	37.2:1	Per	36x5	38x10	Ross	146	Pier	.....	.....	.....
Northwestern WT	4900	2950	Cont	4 1⅛x5¼	27.2	L	C	MR	S	Strm	...	Bos	...	H	Selec	3	...	Bld	W	Shel	.....	.....	Shel	34x4	36x7	Ross	164	.....	.....	.....	80
Ogden B1	4300	2695	Cont	4 1⅛x5¼	27.2	L	C	T	B	Rayf	G	Bos	...	B	B-Li	4	U	Acme	W	Timk	8.5:1	12.5:1	Tut	36x4	36x7	Gem	160	Pier	Stn	.....	70
Oneida C9	....	2900	Own	4	25.6	L	C	..	...	C	..	Mag	..	...	Own	3	A	.....	...	Own	.....	.....	S-El	36x4	36x7	.....	160	Own	.....	.....	82.5
Oshkosh AA4	4200	3600	H-Sp	3½x5	19.6	L	T	C	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Own	165	Dup	Bim	Fir	60
Oshkosh A4	4200	3500	H-Sp	3½x5	19.6	L	T	C	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Own	130	Dup	Bim	Fir	60
Packard 2E	5100	3600	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	7.25:1	33.3:1	.....	34x4	34x4†	Own	144	Own	.....	.....	48.2
Parker F9W	4500	3500	Wis	4 x6	25.6	L	C	O	F	Strm	G	Bos	W	L	Full	4	A	Arv	W	Own	7.75:1	37.2:1	S-El	34x4	34x6†	Ross	150	Mon	Bim	.....	80
Pierce-Arrow X4	6150	4300	Own	4 x5½	25.6	T	P	T	F	Own	G	Dix	...	C	Selec	4	A	Own	W	Flot	7:1	37.08:1	S-El	36x4	36x4†	Own	150	Own	Own	Own	70
Pioneer F	....	2390	Cont	4 1⅛x5¼	27.3	...	C	.....	...	Strm	..	Eis	...	...	B-Li	4	.....	.....	W	Timk	.....	.....	.....	36x4	36x7	.....	164	.....	.....	.....	.....	...
Rainier R8	3600	2400	Cont	3¾x5	22.5	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	8.66:1	28.83:1	Per	34x4	34x6	Ross	147	Mon	Sch	.....	80
Rowe CDW	4500	3300	Wis	4 x5	32	L	C	M	F	Zen	G	Bos	...	L	B-Li	4	U	Arv	W	Shel	7.75:1	11.75:1	Shel	34x4	34x4†	Ross	142	Simp	Hoo	.....	53
Royal	....	3200	Wis	4 x5	25.6	...	C	T	...	Strm	...	Bos	Q	B	Own	..	....	Own	W	Timk	.....	.....	Mer	36x4½	36x6	Ross	..	Mon	.....	.....	.....
Sandow I	3800	2375	Cont	3¾x5	22.5	L	P	T	B	Strm	G	Eis	...	D	Full	3	U	Spic	I	Torb	10:1	30:1	GC	36x4	36x6	Ross	150	.....	Pru	.....	70
Schacht	5500	3350	Buda	4¼x5½	28.9	L	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	8.66:1	27.06:1	Nat	36x4	36x7	Own	144	Dup	StM	.....	70
Schwartz C	4000	2675	Cont	4 1⅛x5¼	27.2	L	C	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	Hart	I	Torb	9.1:1	36.49:1	Row	36x4	36x7	Ross	146	Pier	Sch	.....	....
Schwatrz 2C	4000	2675	Cont	4 1⅛x5¼	27.2	L	P	Fed	B	Strm	..	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	36x4	36x7	Ross	132	Pier	Sch	.....	....
Selden 2½A	5400	3290	Cont	4 1⅛x5¼	27.2	L	P	Bus	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	37.5:1	Per	36x4	36x7	Gem	145	Pier	Arc	.....	70
Signal J	5010	3100	Cont	4 1⅛x5¼	27.2	L	C	MeC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	4:1	Det	34x4	36x8	Ross	150	Pier	Hay	Gdy	80
Standard 76	4430	3200	Cont	4 1⅛x5¼	27.2	L	C	T	B	Strm	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	7.75:1	37.6:1	.....	36x4	36x6	Ross	140	.....	.....	.....	70
Stewart 7	4460	2575	Cont	4⅛x5¼	27.2	L	C	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Cl	9:1	27:1	Det	34x4	34x7†	Ross	156	Pier	Wan	Fir	72
Stoughton D	....	....	.....	4 x5½	25.6	...	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x4	36x7	.....	140	.....	Own	Gdy	...
Sullivan E	4500	2975	Buda	4 1⅛x5½	27.2	L	P	V	F	Strm	V	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	26:1	Shel	36x4	36x7	Ross	150	.....	Wan	.....	71
Sullivan EL	4500	3050	Buda	4 1⅛x5½	27.2	L	P	V	F	Strm	...	Bos	...	L	B-Li	3	....	Spic	W	Timk	.....	.....	Shel	36x4	36x7	Ross	168	.....	.....	.....	71
Superior E	3600	2475	Cont	4⅛x5¼	27.2	L	P	I	G	Strm	V	Eis	...	F	Full	3	U	Arv	I	Torb	8:1	23.2:1	Tut	36x4	36x6	Ross	144	Pier	Sch	Fir	75
Traffic	3175	1395	Cont	3¾x5	22.5	L	T	C	B	Cart	G	Bos	...	C	Covt	3	U	UM	I	Russ	8.2:1	22.96:1	Det	34x3½	34x5	Own	133	.....	Roy	Fir	85
Transport 50	4285	2585	Cont	4 1⅛x5¼	27.2	L	P	C	B	Strm	G	Eis	...	F	Full	4	U	Arv	I	Cl	8.15:1	39:1	Det	36x4	36x7	Jac	150	Dup	.....	Fir	70
Triangle C	4200	2485	Wau	3¾x5	22.5	L	C	Per	S	Strm	G	Fis	...	F	Full	3	U	UP	I	Cl	8:1	24:1	Det	36x3½	36x6	Gem	146	Wau	Roy	Fir	60
Triumph 2	4900	2950	Buda	4¼x5½	22.5	...	C	H	S	Strm	V	Dix	...	B	Cott	3	U	Hart	I	Russ	.....	8:1	S-El	36x4	36x3½†	Lav	144	Pier	Stn	Stn	70
Vim 22	4700	3150	Her	3¾x5½	22.5	L	G	MeC	F	Zen	G	Dix	...	L	B-Li	4	U	Spic	W	Shel	7.75:1	.....	Shel	36x4	36x6	Gem	142	Dup	Smi	.....	...
White 20	4150	3300	Own	3¾x5½	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	R	Own	.....	.....	.....	36x4	36x7	Own	157	.....	.....	Fir	70
Wichita M	4700	2750	Wau	3¾x5¼	22.5	L	P	Per	C	Strm	G	Bos	...	C	Covt	3	A	Own	W	Shel	10.66:1	3.65:1	.....	36x4	36x6	Ross	144	Wau	Bim	Fir	....
Winther 49	5300	3000	Wis	4 x5	25.6	L	P	T	G	Mas	V	Eis	B	F	B-Li	4	A	Bld	I	Cl	8.12:1	32.5:1	Math	34x4	34x4	Ross	150	.....	Own	.....	80
Witt-Will WD2-19	4550	2950	Cont	4⅛x5¼	27.2	O	G	C	B	Zen	V	Eis	...	D	Selec	3	U	Spic	W	Timk	7.8:1	23.4:1	S-El	36x3½	36x7	Ross	144	Pier	Arc	SAE	70

2½ Ton

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Acason H	4354	3150	Wau	4¼x5¾	28.9	L	P	Can	S	Sheb	V	Eis	...	B	Cott	3	U	Bld	W	Timk	8.5:1	40.37:1	Det	36x4	36x7	Ross	150	Wau	Bim	.....	76
Ace	5300	....	Buda	4¼x5½	28.9	L	C	Spi	F	Sheb	G	AtK	W	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Math	36x4	36x7	Ross	156	Pier	Day	.....	80
Apex E	4500	2450	Buda	4¼x5½	28.9	L	C	Can	P	Strm	V	Eis	Q	F	Full	3	U	UP	I	Torb	9:1	27:1	Det	36x4	36x6	Lav	150	Dup	.....	Fir	70
Armleder HW	4550	....	Cont	4⅛x5¼	27.2	L	C	T	F	Zen	G	Bos	...	D	B-Li	3	U	Opt	W	Timk	8.5:1	34:1	Math	36x4	36x7	Ross	148	.....	StM	.....	75
Atterbury 7CX-LWB	5325	3275	Cont	4⅛x5¼	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	171	Mon	Arc	Fir	92.5
Atterbury 7CX-STD	5260	3175	Cont	4⅛x5¼	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	153	Mon	Arc	Fir	92.5
Available H2½	5200	....	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Wis	8.66:1	34.66:1	Tut	36x4	36x8	Ross	152	Pier	Sch	.....	75
Bessemer J-2	4500	2785	Cont	4⅛x5¼	27.2	L	C	C	B	Rayf	..	Bos	...	B	B-Li	4	....	Arv	I	Torb	.....	.....	Per	36x4	36x4†	Ross	158	Pier	.....	.....	67
Bethlehem E	3910	2365	Own	4 x4½	25.6	L	T	Fed	B	Sheb	G	Will	G	B	Det	3	U	UP	I	Russ	8.8:1	28.16:1	Shel	34x4	34x6	Lav	144	Mon	Wan	Fir	85
Betz D2	4750	2785	Buda	4¼x5½	28.9	L	C	T	F	Strm	...	Bos	...	L	B-Li	4	....	UM	W	Timk	.....	.....	Tut	36x4	36x7	Ross	150	Pier	.....	.....	75
Brinton F	4500	3000	Cont	4⅛x5¼	27.2	L	C	T	F	Strm	G	Bos	...	D	Selec	3	U	Spic	W	Flot	1:1	3.36:1	S-El	36x4	36x6	Ross	Q	Pier	Sch	.....	.....
Brockway K4	4700	3100	Cont	4⅛x5¼	27.2	L	C	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Mer	36x4	36x7	Gem	152	Mon	Hoo	.....	80
Chicago C2½	4500	3100	Her	4 x5⅛	25.6	L	..	T	F	Strm	G	Bos	...	L	B-Li	4	U	Peters	W	Timk	8.5:1	34:1	Math	36x4	36x7	Gem	156	Simp	Q	Stn	....
Clydesdale 65X	4850	3200	Cont	4⅛x5¼	27.2	L	C	T	S	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Stan	36x4	36x8	Ross	163	Own	Smi	.....	73
Columbia G	48 0	2750	Hink	4 x5¼	25.6	L	C	T	F	Strm	V	Bos	...	B	Covt	3	A	Spic	I	Russ	9.5:1	.....	Per	36x4	36x7	Own	144	Hink	.....	.....	80
Concord B	4600	3200	Buda	4¼x5½	28.9	L	C	T	S	Zen	..	Eis	...	L	B Li	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x4†	Ross	150	Mon	.....	.....	70
Corbitt B	5000	3500	Cont	4⅛x5¼	27.2	L	C	MeC	B	Strm	V	Eis	...	D	B-Li	4	U	Hart	W	Shel	8.75:1	35:1	Shel	36x4	36x7	Ross	148	Simp	Bim	Fir	75
Dart M	4800	3000	Buda	4¼x5½	28.9	L	C	C	F	Zen	G	Eis	...	F	Full	4	U	Spic	W	Own	8.5:1	38:1	Per	36x4	36x7	Ross	150	Pier	Pru	.....	80
Day-Elder C	5300	2850	Buda	4¼x5½	28.9	L	P	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	10.67:1	39.8:1	Shel	36x4	36x7	Ross	150	Mon	Jon	.....	72
DeKalb E2½	4800	2600	Cont	4⅛x5¼	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Flot	9.33:1	33:1	Math	36x5	36x6	Ross	144	.....	Hay	.....	71
Denby 25	4790	3250	Cont	4⅛x5¼	27.2	L	C	L	B	Strm	G	Eis	...	F	Full	4	....	UP	I	Russ	10.9:1	52.3:1	Det	36x4	36x7	Gem	150	Mon	Day	.....	79.4
Doane 1919	5000	3750	Wau	4¼x5¾	28.9	...	C	C	S	Mas	...	Bos	...	D	Selec	3	U	D	C	Dead	7.72:1	.....	.....	36x5	36x7	Lav	156	Wau	.....	.....	79
Douglas E	4500	2525	Buda	4¼x5½	28.9	L	C	Own	F	Sheb	...	Eis	...	F	Full	4	....	Arv	I	Torb	.....	.....	Own	34x4	36x7	Ross	155	Pier	.....	.....	65
Erie 2½	5400	....	Buda	4¼x5½	28.9	L	C	MeC	B	Strm	...	Bos	...	D	Full	4	....	Spic	W	Shel	.....	.....	Per	34x4	36x6	Ross	150	Pier	.....	.....	80
Fageol 3400	4600	....	Wau	4¼x5¾	28.9	L	C	Spi	S	Zen	G	Dix	...	B	Selec	5	A	Spic	W	Timk	5.6:1	59.5:1	Math	34x4	36x7	Ross	144	Wau	Pru	.....	80
Gary J	4850	2750	Buda	4¼x5½	28.9	L	C	T	F	Mas	G	Eis	...	D	B-Li	4	U	Spic	W	Timk	8.5:1	40.8:1	S-El	36x4	36x7	Ross	148	Pier	Pru	Gdy	...
Gersix K	5200	3150	Buda	4¼x5½	28.9	L	C	I	F	Strm	V	Bos	...	D	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Mon	Jon	.....	75
Gramm-Bernstein 25	5300	3650	Hink	4¼x5½	28.9	L	C	I	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	7.75:1	36.7:1	.....	36x4	36x4†	Ross	150	.....	.....	Fir	91.3
Hahn EE	5000	....	.....	4½	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Timk	.....	.....	.....	36x4	36x8	Ross	145	Pier	.....	.....	.....
Harvey WFA	5300	3300	Buda	4¼x5½	28.9	L	P	..	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	7.75:1	31:1	Shel	36x4	36x7	Ross	150	Dup	Sch	.....	60
Hendrickson I	....	3000	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	7 75:1	37.2:1	S-El	36x4	36x7	Ross	Q	Pier	.....	.....	80
Hewitt-Ludlow	4800	3300	Buda	4¼x5½	28.9	...	..	T	F	Strm	...	.....	...	B	Cott	4	.....	Spic	W	Wis	.....	.....	.....	36x4	36x7	Ross	150	.....	.....	.....	....
Indepen't H, Youngst'n, O	4600	....	Cont	4½x5¾	32.4	L	P	C	C	Sheb	G	Eis	...	F	Full	3	U	Spic	W	Wis	9.66:1	39:1	S-El	36x4	36x8	Ross	148	Pier	.....	.....	.....
Jumbo 25	....	3095	Buda	4¼x5½	28.9	...	P	Own	F	Zen	...	Eis	...	F	Full	4	....	Arv	I	Cl	.....	.....	Det	36x4	36x7	Jac	152	.....	.....	.....	.....

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3½ Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cents of Weight on Rear Wheels
G.M.C. 71A	7540	3950	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5†	40x5†	Jac	163	Mon	Own	SAE	75
G.M.C. 71B	7655	4025	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5	40x5†	Jac	187	Mon	Own	SAE	75
Gramm-Bernstein 35	6900	4450	Hink	4½x5½	32.4	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	8.75:1	50.6:1	.....	36x5	40x5†	Ross	156	.....	.....	Fir	91.7
Hahn F	7000	.....	.....	4½	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	.....	36x5	36x5†	Ross	Q	Pier	.....	.....	....
Hall	6100	3750	Cont	4½x5½	32.4	L	P	L	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	10.33:1	.....	Det	36x5	36x5†	Gem	Q	Dup	Smi	.....	....
Harvey WHA	7700	4300	Buda	4½x6	32.4	L	P	T	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x5	36x5†	Ross	160	Dup	Smi	.....	60
Hendrickson J	.....	3800	Buda	4¼x5¾	28.9	L	P	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	10.33:1	49.6:1	Tut	36x5	36x5†	Ross	Q	Pier	.....	.....	80
Hewitt-Ludlow	6300	4000	Buda	4½x5½	28.9	...	...	.....	...	Strm	...	Bos	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x5	36x5†	Ross	156	.....	.....	.....	....
Hurlburt	6400	4400	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	8.66:1	41.91:1	.....	36x5	36x5	Ross	152	Dup	Wan	.....	....
Indiana 35	7100	3750	Own	4⅜x5½	30.6	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	10.25:1	49.6:1	S-El	36x5	36x5†	Wohl	160	Pier	Smi	.....	75
International L	7500	.....	Own	4¼x5	28.9	O	T	Own	B	Ens	G	Dix	O	D	Own	4	A	Own	I	Own	11:1	53.25:1	.....	36x5	40x10	Own	160	Own	Own	Fir	50
Jumbo 35	.....	4300	Buda	4½x6	32.4	...	P	Own	F	Zen	..	Eis	...	L	B-Li	4	....	Spic	I	Cl	.....	.....	Per	36x5	36x10	Jac	165	.....	.....	.....	....
Kalamazoo K	7370	3900	Cont 6	3¾x5¼	33.8	L	P	Hvn	B	Strm	V	Bos	D	B	Full	4	A	Acme	W	Shel	10:1	.....	Shel	36x5	36x5†	Ross	160	Pier	Bim	.....	....
Kelly-Springfield K40	8285	4400	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.48:1	31.6:1	Pier	36x5	40x5†	Gem	150	Pier	StM	.....	93
Kissel Heavy Duty	6840	3975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.75:1	58.6:1	Shel	36x5	36x5†	Ross	168	Pier	Smi	.....	80
Kleiber C	.....	4400	Cont	4½x5½	32.4	...	..	.....	...	Strm	G	Bos	...	...	B-Li	..	A	.....	W	.....	8.75:1	35:1	.....	36x5	36x10	Ross	163	.....	W&L	.....	....
Larrabee-Deyo AB	6850	4000	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M	W	Shel	10.25:1	41:1	Mer	36x5	36x5†	Ross	172	Pier	Hoo	.....	....
Maccar M	6175	4300	Cont	4½x5½	32.4	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	8.75:1	35.09:1	Mer	36x5	36x5†	Ross	174	Pier	Day	Fir	70
Mack AC	7070	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	9.18:1	27.2:1	Mer	36x5	40x5†	Gem	168	Own	Sch	.....	65
Master A	7000	3990	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	158	Pier	Pru	.....	72
Master AL	7200	4090	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	194	Pier	Smi	.....	72
Menominee G	....	4270	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	F	Full	4	A	Spic	W	Timk	10.33:1	41.32:1	Tut	36x5	36x6†	Gem	160	Pier	Stn	Fir	80
Nelson & LeMoon F3½	6000	7280	Cont	4¼x6½	28.9	T	C	T	S	Strm	G	Bos	...	L	B-Li	4	U	Own	W	Timk	8.75:1	2:1	Tut	36x5	36x5†	Lav	Q	Mon	Pru	Gdy	80
Noble E70	6500	.....	Buda	4½x6	32.4	...	C	T	...	Strm	G	Eis	...	F	Full	4	A	.....	W	Shel	8.75:1	.....	S-El	36x5	36x10	Lav	196	Pier	Bim	Fir	....
Northway B3	7260	4250	Own	4 x6	25.6	O	C	GO	B	Sheb	V	Bat	N	F	Full	4	U	Spic	N	Shel	10.25:1	49.2:1	Per	36x5	40x10	Ross	160	Pier	.....	.....	....
O.K. 3½T	.....	3850	Buda	4¼x6	32.4	...	P	Owen	B	Zen	V	Eis	...	F	Full	4	U	.....	W	Wis	.....	.....	Tut	36x5	36x10	Ross	164	Pier	.....	.....	....
Old Reliable C	6650	4000	Wis	4¼x6	28.9	L	C	T	B	Strm	V	Bos	...	D	Full	4	A	Spic	W	Shel	8.75:1	42.5:1	Shel	34x5	36x5†	Ross	160	Mon	StM	.....	75
Oneida D9	.....	3800	Own	.....	22.5	L	C	.....	...	.....	...	Mag	...	...	.....	4	A	.....	...	Own	.....	.....	S-El	36x5	36x10	.....	170	Own	.....	.....	....
Paige 51-18	7000	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	D	Selec	4	A	Spic	W	Timk	10.33:1	49.7:1	Per	36x5	36x5†	Jac	160	Simp	Day	.....	80
Parker J9	6800	4400	Wis	4½x6	32.4	L	C	Own	F	Strm	G	Bos	W	L	Warn	4	A	K-B	W	Own	7.8:1	38.92:1	S-El	38x7*	44x10	Ross	160	Mon	Bim	.....	80
Pioneer A	.....	3290	Cont	4½x5½	32.4	...	C	.....	...	.....	...	Eis	...	...	B-Li	4	....	.....	W	Timk	.....	.....	.....	36x5	36x5†	.....	160	.....	.....	.....	....
Republic 20	6400	3595	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	D	Full	4	U	K-B	I	Torb	10:1	48:1	S-El	36x5	36x10	Jac	165	Phar	Smi	.....	....
Reynolds 3½	.....	4350	.....	4½x5½	32.4	...	C	Own	F	Strm	...	Mag	...	...	Own	4	A	.....	W	Own	.....	.....	S-El	36x5	36x5†	Own	180	Hink	Smi	.....	....
Rowe DEW	6520	4180	Wis	4¼x6	28.9	L	C	Mav	F	Zen	G	Bos	...	L	B-Li	4	U	M	W	Shel	8.75:1	12.75:1	Shel	36x5	36x5†	Ross	156	Simp	Hoo	.....	84
Sandow M	6500	3995	Cont	4½x5½	32.4	L	P	T	B	Strm	G	Bos	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	42:1	GC	36x5	36x5†	Ross	175	Mon	Pru	.....	70
Sanford 35	6600	3975	Cont	4½x5½	42.3	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x5	36x5†	Ross	174	Pier	Hoo	Fir	75
Schacht	6500	4150	Buda	4¼x5½	28.9	L	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	10.33:1	32.31:1	Nat	36x5	36x5†	Own	168	Dup	StM	.....	70
Schwartz D	7000	4500	Buda	4½x6	32 4	L	P	Fed	B	Strm	...	Bos	...	L	B-Li	4	....	M	I	Torb	.....	.....	Row	36x6	36x6†	Ross	170	Dup	Sch	.....	....
Selden 3½A	7100	3990	Cont	4½x5½	32.4	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.25:1	42:1	Per	36x5	36x10	Gem	162	Pier	Arc	.....	70
Service 71	6930	4085	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	8.75:1	42.3:1	.....	36x5	36x5†	Ross	171	Simp	Bim	.....	70
Service 76	7280	4285	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.8:1	37.7:1	.....	36x5	36x5†	Ross	171	Simp	Bim	.....	70
Signal M	7070	4100	Cont	4½x5½	32.4	L	C	McC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	12:1	4.84:1	Det	36x5	40x5†	Ross	168	Pier	Hay	Gdy	80
Standard 66	6480	4200	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.4:1	.....	36x5	36x5†	Gem	160	Mon	.....	.....	75
Sterling 3½	8300	4550	Ster	4¼x6¼	32.4	L	P	Own	S	Rayf	V	Eis	...	M	Own	4	....	Spic	W	Timk	8.75:1	39.5:1	Math	36x5	40x5†	Ross	162	Wau	.....	.....	92
Stewart 10	6080	3500	Cont	4½x5½	32.4	L	P	T	B	Zen	G	Eis	...	F	Full	4	U	Hart	I	Cl	10:1	48:1	Det	36x5	36x5†	Ross	165	Pier	Cla	Fir	80
Tiffin PW	6850	3980	Cont	4½x5½	32.4	L	C	T	S	Sheb	G	Bos	...	F	Full	4	A	Acme	W	Shel	8.7:1	41.7:1	Kal	36x5	36x5†	Ross	160	Pier	Smi	Gdy	80
Titan 3½	7300	4300	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	.....	I	Cl	9:1	48:1	Math	36x5	40x5†	Lav	162	Simp	Day	.....	70
Tower G3½	6800	4100	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Bos	...	F	Full	4	U	NE	W	Timk	10.33:1	50:1	Det	36x5	36x5†	Ross	165	Pier	.....	.....	70
Twin City 4 Wheel D-B	7200	4750	Wis	5½x6	42	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	36x6	36x6	Ross	140	Pier	Arc	SAE	60
United C	.....	3600	Buda	4½x5½	28.9	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	10:1	.....	.....	36x5	36x5†	Ross	160	Simp	Cla	Fir	80
U. S. J	7000	3950	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Eis	...	H	B-Li	4	A	Opt	W	Shel	11.75:1	56.9:1	Shel	36x5	40x5†	Lav	162	Pier	Sch	.....	80
Velie 26B	7400	3900	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	49.88:1	Math	36x5	36x5†	Gem	174	Pier	Bim	Gdy	80
Victor M	6600	3800	Cont	4½x5½	32.4	L	C	Own	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	S-El	36x6	36x5†	Gem	176	.....	.....	.....	....
Ward LaFrance 4A	.....	.....	.....	4½x6¼	32.4	L	C	T	F	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Wis	6.28:1	30.38:1	.....	36x5	36x5†	Ross	158	.....	.....	.....	85
White Hickory M	.....	.....	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	...	D	Full	4	....	.....	W	Timk	.....	.....	S-El	36x5	36x10	W	156	Simp	.....	.....	....
Wichita O	6500	3750	Wau	4½x5¾	32.4	...	C	EM	C	Strm	...	Bos	...	C	B-Li	4	....	Own	W	Shel	.....	.....	.....	36x5	36x5†	Ross	165	Wau	.....	.....	....
Wilcox P	6300	.....	Own	4¼x5	28.9	L	C	T	S	.....	G	Bos	...	C	Selec	4	A	Own	W	½-Fl	11.75:1	51.7:1	Shel	36x6	35x5†	Own	139	Pier	Smi	.....	....
Wilson G	6800	3950	Cont	4½x5½	32.4	L	C	T	B	Mar	G	Eis	...	B	B-Li	4	A	K-B	W	Timk	8.75:1	42.35:1	Per	36x5	36x5†	Ross	160	Pier	.....	.....	80
Winther 479	7700	4900	Wis	4¼x6	28.9	L	P	T	G	Mas	V	Eis	B	B	Full	4	A	Bld	I	Cl	10:1	48:1	Math	36x5	36x5†	Ross	158	.....	Own	Fir	65
Winther 979	....	4250	Wis	4½x6	32.4	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	7:1	33.88:1	Math	38x7*	42x9*	Ross	168	.....	Cla.	.....	80

4 Ton

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cents of Weight on Rear Wheels
Bessemer K2	6740	3985	Cont	4½x5½	32.4	L	C	C	B	Rayf	...	Bos	...	B	B-Li	4	....	Spic	I	Torb	.....	.....	Per	36x5	36x10†	Ross	175	Pier	.....	.....	75
Gabriel F	5800	4300	Buda	4½x6	32.4	L	T	T	F	Rayf	G	Bos	L	B	B-Li	4	A	Spic	W	Timk	10.5:1	1:1	Mer	36x5	40x10	Gem	180	Dup	Smi	Smi	65
Highway-Knight	7400	4800	.....	4 x 6	25.6	S	T	Own	F	Zen	V	Mag	R	O	Own	4	A	Ther	W	.....	8.75:1	42.35:1	.....	36x5	36x5†	.....	159	.....	Sch	.....	90
Jumbo 40	.....	4875	Buda	4½x6	32.4	...	P	Own	F	Zen	...	Eis	...	L	B-Li	4	....	Spi	I	Cl	.....	.....	Per	48x7*	44x10	Jac	165	.....	.....	.....	....
Kelly-Springfield K45	8730	4550	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.71:1	32.3:1	Per	36x5	40x6†	Gem	150	Pier	StM	.....	93
Kimball E	.....	.....	Wis	5.1x5½	41.9	T	C	Flex	F	Zen	V	Ber	...	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x5	40x10	Ross	Q	Dup	Smi	.....	80
King Zeitler	6500	4200	Cont	4½x5½	32.4	L	G	T	B	Strm	...	Bos	...	L	B-Li	4	....	Ther	W	Timk	.....	.....	US	36x5	40x5†	Ross	162	Cont	Smi	.....	80
Moreland 19G	7810	4875	Cont	4¾x6	36.1	L	C	C	B	Mill	...	Dix	...	D	Selec	4	....	Ther	W	Timk	.....	.....	Mer	36x5	40x5†	Lav	180	Pier	.....	.....	80
Noble WW4	7170	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	...	D	Full	4	....	Acme	W	Shel	.....	.....	Kal	36x5	36x5†	Ross	168	Pier	.....	.....	80

4 Ton—Continued

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Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
5½, 6 and 7 Ton—Continued																															
Winther 149	9600	5500	Wis	5 1/8x6	42	T	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x6	40x7	Ross	162	Dup	.....	.....	80
Couple Gear LO6	12000	7350	Wis	5¼x7	44.1	T	G	H	F	Strm	G	Eis	O	...	Own	5	....	Own	B	Own	12:1	.....	Tut	36x5†	36x6	Own	144	.....	Own	Own	65
Mack AC	9050	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	11.58:1	37.16:1	Mer	36x7	40x7†	Gem	168	Own	Sch	.....	73
Old Reliable K,L,M	10240	6000	Wau	4¾x6¾	36.1	L	C	T	B	Strm	G	Bos	...	W	D-Sea	4	A	Spic	W	Shel	10.86:1	50.9:1	Shel	36x6	40x7†	Ross	136	Wau	Smi	.....	78
Royal 7	....	....	Wis	5¼x7	44.1	...	C	T	...	Strm	...	Bos	Q	...	Own	..	A	.....	W	Timk	.....	.....	Mer	36x7	40x7†	Ross	168	Mon	.....	.....	...
Sterling 7½-Chain	....	6000	Ster	5x6¼	40	L	C	Own	R	Rayf	V	Eis	...	M	Own	6	....	UM	C	Own	.....	.....	Math	36x6	40x7†	Ross	174	Wau	Smi	.....	91
Wichita S	9200	5400	Beav	4½x6	32.4	O	P	EM	C	Strm	G	Ber	...	C	Own	4	A	Own	...	Own	13:1	4.78:1	.....	36x6	40x6†	Ross	165	Dup	Smi	.....	90
Gasoline Tractor-Trucks																															
Columbia T	4000	2350	Cont	4 1/8x5¼	27.2	L	C	T	B	Shk	...	Dix	...	C	Covt	3	....	Spic	I	Russ	.....	.....	Per	36x4	36x6	Own	112	Pier	.....	.....	....
Federal Light Duty	4700	2950	Cont	4 1/8x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	110	Phar	.....	Fir	....
Federal Heavy Duty	6800	3825	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	12:1	59.88:1	Math	36x5	36x5†	Gem	114	Phar	.....	Fir	....
Garford 70HT	4750	3290	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Spl	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x7	Ross	119	Simp	.....	.....	....
Garford 77CT	7200	4400	Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x5	40x5†	Ross	105	Simp	Smi	.....	....
Garford 68T	8450	5100	Wis	5.1x5½	41.6	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	....	Spic	C	Dead	.....	.....	Per	36x6	40x6†	Ross	102	Simp	Smi	.....	....
Hewitt-Ludlow 6-Ton	4000	3300	Buda	4¼x5½	28.9	...	...	T	F	Strm	...	Bos	...	B	.....	...	...	Spic	C	.....	.....	.....	.....	36x5	36x4†	Lav	...	.....	.....	.....	....
Hood	2900	1300	Own	3¾x3¾	22.5	T	C	T	S	Holl	G	.....	...	D	Plan	2	U	Own	C	Own	8:1	24:1	Lah	20x3½	20x5	Own	60	.....	Own	.....	65
Jumbo D	4450	2700	Buda	4¼x5½	28.9	L	C	GO	F	Zen	...	Eis	...	F	Full	3	....	Arv	I	Cl	.....	.....	Det	36x4	36x7	Jac	152	Dup	.....	.....	60
Knox 35	8500	5500	Own	5 x5½	40	O	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	60
Knox 36 3-Ton	10000	6000	Own	5 x5½	40	O	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	....
Koehler MT	4750	3250	Her	4 x5⅛	25.6	L	C	T	P	Zen	...	Eis	...	D	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Lav	142	Simp	Wan	SAE	....
Kuhn	9000	5000	Wis	4¼x5½	28.9	T	C	H	S	Rayf	...	Bos	...	C	Selec	4	....	.....	B	Own	.....	.....	.....	36x7	36x7	.....	138	.....	.....	.....	...
Lombard	8000	....	Spec 6	5½x6¾	72.7	...	C	Spec	F	Sheb	P	.....	...	D	Spec	..	A	.....	...	W	.....	.....	.....	.....	.....	Spec	...	.....	.....	.....	90
Mack AB 5-Ton	4940	3400	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Bld	C	Own	10.53:1	42.27:1	Mer	36x4	36x4†	Gem	120	Own	Sch	.....	....
Mack AC 7-Ton	7670	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	10.76:1	34.60:1	Mer	36x5	40x5†	Gem	119	Own	Sch	.....	....
Mack AC 11-Ton	8250	5500	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	11.58:1	37.16:1	Mer	36x6	40x6†	Gem	119	Own	Sch	.....	....
Mack AC 15-Ton	8650	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	14.10:1	45.26:1	Mer	36x7	40x7†	Gem	119	Own	Sch	.....	....
Rennoc 8-Ton	5050	2850	Buda	4 1/8x5½	27.2	L	C	T	F	Strm	...	Spl	...	D	Warn	4	....	Hart	W	Wis	.....	.....	Row	36x5	36x7	Lav	116	Pier	.....	.....	60
Watson	6500	4050	Cont	4½x5½	32.4	L	C	Jam	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	Shel	34x4	36x5	Gem	80	Pier	.....	.....	37

Electric Commercial Cars

E. C. M. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Pr. Cent of Weight on Rear Wheels
Ward WS	750	1400	.....	12	Edis	45	West	West	4	B	Timk	Shel	32x2½	32x3	Own	88	60
C-T ½	1000	1800	1900	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	90	60
Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	93	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
C-T 1	2000	2500	2300	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	100	60
Walker K	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3250	.....	10	Edis	43	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x1†	Ross	115	65
C-T 2	4000	3500	2700	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4†	W	115	60
Walker L	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Edis	35	G-E	G-E	4	W	Shel	Shel	36x4	38x5†	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5†	Ross	135	65
C-T 3½	7000	5000	3950	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6†	36x4	W	122	55
Ward WF	7000	6600	.....	7	Edis	30	G-E	G-E	4	W	Shel	Shel	36x5	36x5	Own	132	60
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5†	Ross	144	65
Couple Gear H	7000	9000	4800	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	55
Couple Gear	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	75
C-T 5	10000	6000	4400	9	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5†	W	132	55
Walker P	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	38x5†	Ross	131	66
Walker N	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	38x6†	Ross	141	66
Ward WH	10000	8375	.....	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x7	40x10	Own	144	60
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
Couple Gear	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5	Own	96	55

Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—Acason Motor Truck Co., Detroit, Mich.
Ace—American Motor Truck Co., Newark, Ohio.
Acme—Acme Motor Truck Co., Cadillac, Mich.
All-American—All-American Truck Co., Chicago, Ill.
Apex—Hamilton Motors Co., Grand Haven, Mich.
Armleder—O. Armleder Co., Cincinnati, Ohio.
Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—Martin Truck & Body Corp., York, Pa.
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—Autocar Co., Ardmore, Pa.
Available—Available Truck Co., Chicago, Ill.

Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa
Belmont—Belmont Motors Corp., Lewistown, Pa.
Bessemer—Bessemer Motor Truck Co., Grove City, Pa.
Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.
Betz—Betz Motor Truck Co., Hammond, Ind.
Brinton—Brinton Motor Truck Co., Philadelphia, Pa.
Briscoe—Briscoe Motor Corp., Jackson, Mich.
Brockway—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.
Cameron—Cameron Motors Corp., New York, N. Y.
Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—Chicago Motor Truck, Inc., Chicago, Ill.
Clydesdale—Clyde Cars Co., Clyde, Ohio.
Collier—Collier Motor Truck Co., Bellevue, Ohio.
Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
Commerce—Commerce Motor Car Co., Detroit, Mich.
Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.

Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—Day-Elder Motors Corp., Newark, N. J.
Dearborn—Dearborn Truck Co., Chicago, Ill.
Defiance—Turnbull Motor Truck & Wagon Co., Defiance, Ohio.
DeKalb—DeKalb Wagon Co., DeKalb, Ill.
Denby—Denby Motor Truck Co., Detroit, Mich.
Diamond T—Diamond T Motor Car Co., Chicago, Ill.
Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
Dispatch—Dispatch Motor Car Co., Minneapolis, Minn.
Doane—Doane Motor Truck Co., San Francisco, Cal.
Dodge—Dodge Bros., Detroit, Mich.
Dorris—Dorris Motor Car Co., St. Louis, Mo.
Douglas—Douglas Motors Corp., Omaha, Nebr.
Duplex—Duplex Truck Co., Lansing, Mich.

Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.
Erie—Erie Motor Truck Mfg. Co., Erie, Pa.
Evans—Evans Truck & Axle Co., Auburn, Ind.

F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.
Fageol—Fageol Motors Co., Oakland, Cal.
Famous—Famous Trucks, Inc., St. Joseph, Mich.
Fargo—Fargo Motor Truck Co., Chicago, Ill.
Federal—Federal Motor Truck Co., Detroit, Mich.
Ford—Ford Motor Co., Highland Park, Mich.
Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.
Fulton—Fulton Motor Truck Co., New York, N. Y.

G. M. C.—General Motors Truck Co., Pontiac, Mich.
Gabriel—Gabriel Motor Truck Co., Cleveland, Ohio.
Garford—Garford Motor Truck Co., Lima, Ohio.
Gary—Gary Motor Truck Co., Gary, Ind.
Gersix—Gersix Mfg. Co., Seattle, Wash.
Giant—Giant Truck Corp., Chicago Heights, Ill.
Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.

Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
Hall—Lewis-Hall Iron Works, Detroit, Mich.
Harvey—Harvey Motor Works, Detroit, Mich.
Hawkeye—Hawkeye Truck Co., Sioux City, Ia.
Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.
Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.
Highway-Knight—Highway Motors Co., Chicago, Ill.
Higrade—Higrade Motors Co., Harbor Springs, Mich.
H & M—H & M Motor Truck Co., Inc., Baltimore, Md.
Hood—Hood Mfg. Co., Seattle, Wash.
Hoover—Hoover Wagon Co., York, Pa.
Huffman—Huffman Bros. Co., Elkhart, Ind.
Hurlburt—Hurlburt Motors, Inc., New York, N. Y.

Independent—Independent Motor Co., Youngstown, Ohio.
Independent—Independent Motor Truck Co., Inc., Davenport, Ia.
Indiana—Indiana Truck Corp., Marion, Ind.
International—International Harvester Co., Chicago, Ill.

Jones—Jones Motor Car Co., Wichita, Kans.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—Kankakee Automobile Co., Kankakee, Ill.
Keldon—House Cold Tire Setter Co., St. Louis, Mo.
Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.
Keystone—Commercial Car Unit Co., Philadelphia, Pa.
Kimball—Kimball Motor Truck Co., Los Angeles, Cal.
King Zeitler—King Zeitler Co., Chicago, Ill.
Kissel—Kissel Motor Car Co., Hartford, Wis.
Kleiber—Kleiber & Co., Inc., San Francisco, Cal.
Knox—Knox Motors Co., Springfield, Mass.
Koehler—H. J. Koehler Motors Corp., Newark, N J.
Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.

Lange—Lange Motor Truck Co., Pittsburgh, Pa.
Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.
Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—Luverne Automobile Co., Luverne, Minn.

Maccar—Maccar Truck Co., Scranton, Pa.
Mack—International Motor Co., New York, N. Y.
Manly—Manly Motors Co., Waukegan, Ill.
Master—Master Trucks, Inc., Chicago, Ill.
Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—Menominee Motor Truck Co., Menominee, Mich.
Moore—Moore Motor Vehicle Co., Danville, Ill.
Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
Muskegon—Muskegon Engine Co., Muskegon, Mich.
Myers—E. A. Myers Co., Pittsburgh, Pa.

Napoleon—Napoleon Motors Co., Traverse City, Mich.
Nash—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—Nelson & Le Moon, Chicago, Ill.
Netco—New England Truck Co., Fitchburg, Mass.
Niles—Niles Motor Truck Co., Pittsburgh, Pa.
Noble—Noble Motor Truck Co., Kendallville, Ind.
Northway—Northway Motors Co., Natick, Mass.
Northwestern—Starr Carriage Co., Seattle, Wash.
Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.

O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—Ogden Motor & Supply Co., Chicago, Ill.
Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—Olds Motor Works, Lansing, Mich.
Oneida—Oneida Motor Truck Co., Green Bay, Wis.
Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
Overland—Willys-Overland Co., Inc., Toledo, Ohio.

Packard—Packard Motor Car Co., Detroit, Mich.
Paige—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—Hebb Motors Co., Lincoln, Nebr.
Piedmont—Piedmont Motor Car Co., Inc., Lynchburg, Va.
Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—Pioneer Motor Truck Co., Detroit, Mich.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.

Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.
Reliance—Reliance Motor Truck Co., Appleton, Wis.
Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa.
Reo—Reo Motor Car Co., Lansing, Mich.
Republic—Republic Motor Truck Co., Inc., Alma, Mich.
Reynolds—Reynolds Motor Truck Co., Mt. Clemens, Mich.
Riker—Locomobile Co. of America, Bridgeport, Conn.
Rock Falls—Rock Falls Mfg. Co., Sterling, Ill.
Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.
Royal—Royal Motor Truck of N. Y., New York, N. Y.

Sandow—Sandow Motor Truck Co., Chicago, Ill.
Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—G. A. Schacht Motor Truck Co., Reading, Pa.
Schwartz—Schwartz Motor Truck Co., Reading, Pa.
Selden—Selden Truck Corp., Rochester, N. Y.
Service—Service Motor Truck Co., Wabash, Ind.
Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
Signal—Signal Motor Truck Co., Detroit, Mich.
Standard—Standard Motor Truck Co., Detroit, Mich.
Sterling—Sterling Motor Truck Co., Milwaukee, Wis.
Stewart—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—Stoughton Wagon Co., Stoughton, Wis.
Sullivan—Sullivan Motor Truck Co., Atlanta, Ga.
Superior—Superior Motor Truck Co., Atlanta, Ga.

Texan—Texas Motor Car Asso., Fort Worth, Texas.
Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
Titan—Titan Truck Co., Milwaukee, Wis.
Tower—Tower Motor Truck Co., Greenville, Mich.
Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—Transport Truck Co., Mt. Pleasant, Mich.
Triangle—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.

Union—Union Motor Truck Co., Bay City, Mich.
United—United Motors Co., Grand Rapids, Mich.
U. S.—United States Motor Truck Co., Cincinnati, Ohio.

Velie—Velie Motors Corp., Moline, Ill.
Victor—Victor Motor Truck & Trailer Co., Chicago, Ill.
Vim—Vim Motor Truck Co., Philadelphia, Pa.

Walker—Walker Vehicle Co., Chicago, Ill.
Walter—Walter Motor Truck Co., New York, N. Y.
Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—Watson Wagon Co., Canastota, N. Y.
White—White Co., Cleveland, Ohio.
White Hickory—White Hickory Wagon Mfg. Co., Atlanta, Ga.
Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—J. C. Wilson Co., Detroit, Mich.
Winther—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—Witt-Will Co., Inc., Washington, D. C.
Wolverine—American Commercial Car Co., Detroit, Mich.

TRUCK EQUIPMENT AND APPLIANCES

New Edward Axle for Gasoline Trucks

The Edward Valve & Mfg. Co., Chicago, Ill., is now placing upon the market a new model truck rear axle unit in sizes up to 10 tons capacity. While this axle is new so far as application to gasoline trucks is concerned, it is not an experiment inasmuch as it has been in successful use on Walker electric trucks for many years.

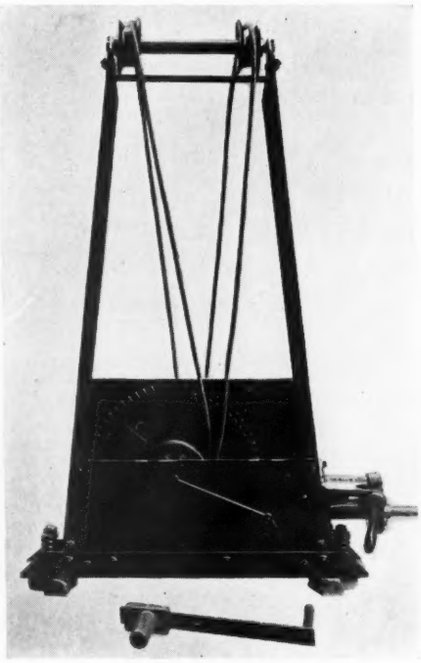
This axle entirely inclosed in a single tubular cross member, will successfully fulfill all the demands of load carrying and driving. Power is received in the usual way. The bevel drive pinion and gear is mounted with the differential assembly. Power is transmitted from the differential by a floating drive shaft, which extends through the center of the load-carrying member to a pinion located in the center of each rear wheel. This pinion floats in mesh between two gears that idle on a cross member, which in turn, mesh with the internal gear or geared track in the wheel, encircling all and keyed to the wheel itself. The idler gears are placed 180 deg. apart with their line of centers parallel to the ground. They run on substantial roller bearings, mounted between two arms which project from the yoke. This yoke is lightly pressed and securely clamped into the end of a cast steel housing and projects a considerable distance into the housing, thereby adding strength and carrying capacity to the axle. This entire drive operates dust-tight in a bath of oil.

The exterior of the rear axle is accessible from all sides for cleaning. The differential and bevel gear are set in a removable unit carrier, facilitating change of gear ratio and adjustment of bearings.

Among other features the following are claimed; final application of power to the drive wheel at points, as near as possible, to the rim of the wheel; speed reduction of sufficient range; oil tight chambers enclosing the working parts in a bath of lubricant; ample road clearance and an unusual absence of noise while in operation.

Columbian Hand Hoist

The Columbian Steel Tank Co., 1605 W. 12th St., Kansas City, Mo., announces improvements in the latest Columbian Hand Hoist for dump bodies. The principal improvements incorporated in this new model are the enlarged grooves in the pulleys, thus reducing the possibility of the rope slipping off and the provision of a tubular member between the pulleys to prevent them from coming together. The brake, dog, ratchets and the gearing also have been improved. The general improvements makes the hoist operation more perfect. The dump body is allowed to come back into position by its own gravity and by throwing on the brake, the speed is regulated. The dog can be thrown into position to retain the body at any desired height.



Columbian Hoist
This hoist has been improved considerably from the former model

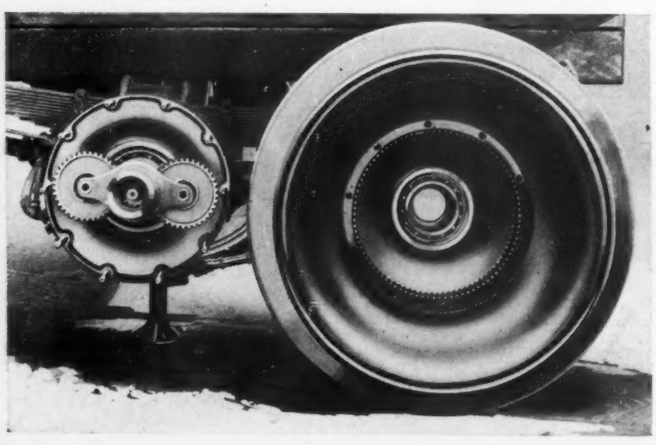
A New Suction-Operated Governor for Trucks

The United Parts Co., Milwaukee, Wis., is manufacturing a governor operated by the suction of the intake below the throttle. It is known as the Motor Master.

It is stated not to be affected by the sudden rise of suction when the throttle is closed. The action of the Motor Master is claimed to keep the momentum of the flywheel practically constant, assuring a steady torque on the drive shaft. It has but three moving parts, operating in ball bearing and entirely inclosed. Being suction operated, it is controlled according to the load.

The body is made of aluminum with wearing parts of steel and the butterfly is set in ball bearings. The device is designed to be used on any standard make of carburetor and is furnished regularly with standard S. A. E. flanges. It is simply bolted in place and connected to the throttle rod. The butterfly throttle is indirectly connected to the throttle valve by link or lever, the fulcrum of which is changed by advancing or retarding the throttle lever. One end of this link is connected to the piston rod, which is actuated by suction; the other end is connected to the throttle rod shaft through a bell crank. The action of the suction closes the butterfly valve and is balanced by a spring, the tension of which is adjustable.

It will thus be seen that the suction between the throttle and the intake valve is influenced by two conditions, namely, the speed of the engine or the amount of gas used, and the second by the opening of the throttle.



The New Edward Truck Axle
This illustration shows one wheel, which gives a view through the wheel, removed from one end of the axle. Note the driving pinion that drives the two idle gears which in turn engage the internal gear.

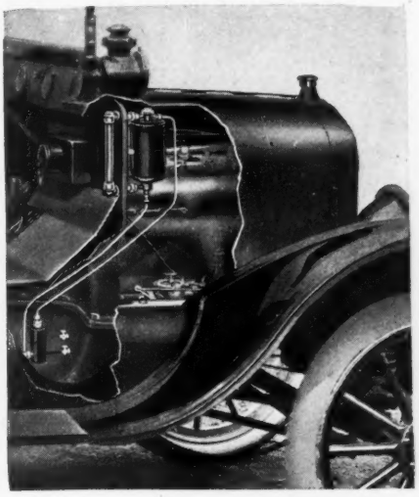


The Motor Master

Oil Level Maintainer for Ford Crankcase

A new device known as the Fracto Visible Lubricator for Ford trucks and cars has been offered to the trade by the Fracto Specialty Co., Inc., 161 Massachusetts Ave., Boston, Mass. The object of this device is to maintain a constant oil level in the Ford crankcase without giving this matter the attention it ordinarily requires.

This device includes a tank, capable of holding a quart and a half of lubricating oil, which is attached to the dash immediately under the hood. It also consists of a gage, which is within easy view of the operator, on the dash; an oil regulator which is located at the rear end of the crankcase, and two copper tubes which connect the tank and the regulator.



Visible Lubricator for Ford

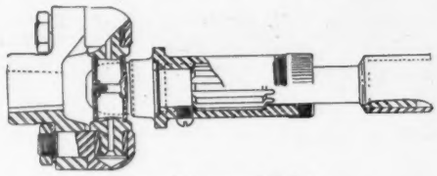
This device maintains a standing level in the crankcase without eliminating the attention that is ordinarily required.

When the oil sinks below a pre-determined level an air vent is automatically opened, allowing oil to flow from the reserve tank to the crankcase until the consumed oil has been replenished. When the correct level is attained the oil closes the vent, creating a vacuum in the tank, thereby preventing a continued flow. The feature of this device is the fact that no matter how small the amount of oil consumed it is immediately rep'aced.

The price of this outfit is $12 complete.

Peters Universal Joint

The Peters line of universal joints and propeller shaft assemblies are manufactured in six different sizes by the Peters Machine & Mfg. Co., Cleveland, Ohio. The joints operate entirely immersed in oil. This is accomplished by keeping the reservoir in the cross filled with a heavy lubricating oil. Centrifugal force throws the oil to the bearing pins. In this manner lubrication is assured as long as there is a sufficient amount of lubricant within. These simply designed joints are very strong, durable and accessible. All parts subject to wear are carefully case hardened and ground. Interchangeability of parts, all of which are made in



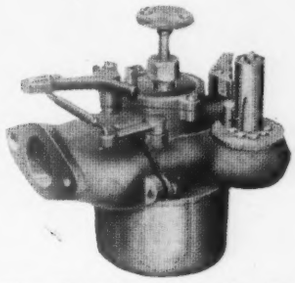
Peters Universal Joints

accordance with the S. A. E. specifications with corresponding series, is another feature valued from the service angle and under S. A. E. specifications.

Chandler Carburetor

A new, effective carburetor, consisting of but few moving parts, is being marketed by the Holland Brass Works, 616-20 Monroe St., Chicago, Ill. It has two simple adjustments and one moving part. It is claimed to meter and govern the air making the best firing mixture independent of speed.

This carburetor admits air at a point between the throttling butterfly valve and



This New Chandler Carburetor Consists of Few Moving Parts

the firing chamber. The amount of air admitted is dependent upon the position of the throttle and the speed of the engine. Cranking is said to be greatly facilitated by a bypass that carries gasoline from a small paddle to the engine. The gas spray jet in this carburetor is subject to the same vibration and suction as the spring air valve, shown at the right in the illustration. This combination is stated to give the engine a powerful firing mixture on acceleration.

Wedge-Rite Piston Rings

Attention is called to the expanding qualities of a new piston ring, the Wedge Rite. It is claimed to expand in width as well as in diameter. It is manufactured by the Wedge Rite Piston Ring Co., Inc., Plattsburg, N. Y. The maker claims that the "V" member of this ring results in the complete filling of any worn groove in the piston and the automatic taking up of all additional wear. It is also said that the steady pressure of the ring against the groove walls reduces piston slap. The rings are made of a very close-grained gray iron and each individual casting is machined.



Wedge-Rite Rings Installed

Light Weight Pistons

Light Weight Pistons made of heat treated gray iron and reinforced by a system of webbing in both the head and skirt is the new product of the Clark-Turner Piston Co., 1246 S. Los Angeles St., Los Angeles, Calif. They are known as the DeLuxe Light Weight Gray Iron



Clark-Turner Piston

This cutaway view shows how this heat-treated grey iron piston is reinforced by a system of webbing in both the head and skirt.

Pistons. These pistons are all carefully and accurately machined and balanced. The accompanying illustration shows a cutaway view of one of these pistons.

New Separatorless Battery

A battery that dispenses with separators, utilizing instead, narrow hard rubber chocks to keep the plates apart, is the new product offered to the trade by the Electrolyte Storage Battery Co., Clarion and Floris Sts., Philadelphia, Pa. This elimination of the formerly used wood separator is claimed to facilitate unretarded action of acids on the plates of the battery, thus giving greater efficiency. It also reduces the possibilities of su'phation. It is unnecessary to recharge and overcharge to prevent and reduce sulphation. Moreover, it is stated that there is no need to limit the discharge to a certain voltage per cell, or to wash the plates when not in use for an extended period. It is also stated that heavy discharges do not injure the plates or cause buckling. The time necessary to recharge a battery is greatly reduced, due to the fact that there is free access to the current in passing about the plates.

Westinghouse Protection Switch

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has announced a new Motor-Starting Switch to provide complete protection to the operators of motors. It is known as the Type WK-100 Switch and is for connecting single or polyphase alternating current motors from 1 to 10 hp., 250 to 550 volts, to the line without the use of auto-transformers or resistance. The entire mechanism, except the operating handle is in a steel box. The cover of the box cannot be opened unless the switch is in the off position and vice versa, the switch cannot be closed while the door is open. No-voltage protection to the motor is by magnetic release which opens the switch automatically and an overload protection is by means of relays. The switch is so arranged that it cannot be kept open on an overload or no-voltage even if the handle is held in the on position. This switch is mounted on a slate base.



This Box Cannot be Opened Unless the Switch is Off.

New Tow Chain

A new accessory has come to the attention of the trade. It is an 18 ft. heavy link tow chain, recently introduced by The Chain Products Co., of Cleveland. The links are unusually heavy and strong and the hook at each end is drop forged. Both ends are covered so that the enamel of neither the car towing or the car being towed are scratched by the links while coupling or uncoup'ing.



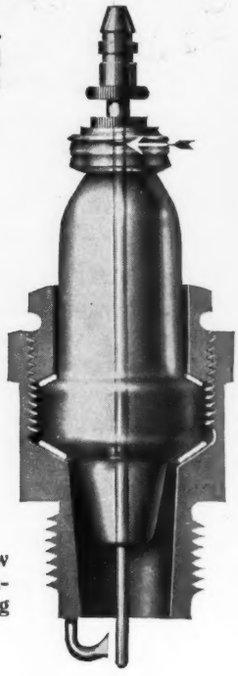
Portable Tow Chain

Another feature is that each chain is packed in an individual bag, making it easy to handle and keeping any mud picked up, off the other tools in the tool box.

The Bulldog tow chain is made of 5-16 in. material with a tensile strength of 4400 lb.

Vacuum-Fire Spark Plug

The Penn Mfg. Co., 319 West Ninth St., Kansas City, Mo., is introducing another new plug known as the Vacuum-Fire. The Penn line also includes the Penn Quaker, Penn Junior and Penn Tractor. The Vacuum-Fire plug is constructed on the jump gap principle, a static condenser in the head of the plug firing into a vacuum chamber and intensifying the flame. The intensified flame is declared to penetrate oil or grease.



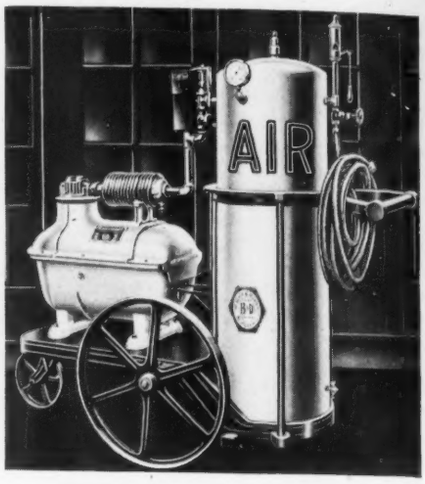
Phantom View of the Vacuum-Fire Spark Plug

An innovation in the Vacuum-Fire plug is a bushing of Parkerized steel, a steel that is said not to rust if exposed to the elements. Because of the use of Parkerized steel in the screw joint, the Vacuum-Fire plug may be disassembled with little effort no matter how long it has been in use. The extra heavy and durable porcelain is known as "999." The electrode is a 92 per cent. nickel composition, and the point is wide, delivering a flame which tends to burn away carbon. This plug retails at $1.25.

Electric Compressor for Inflating Truck Tires

The Black & Decker Company, Towson Heights, Baltimore, Md., has announced a new Electric Compressor Outfit, Model 46. It is especially adaptable for heavy tire inflation service. The practicability of this new outfit has been thoroughly demonstrated, in that it successfully passed the strenuous tests to which it had been put before it was officially announced. This machine is featured by the fact that it is lubricated by grease, thus dispensing with the necessity of maintaining a constant oil level and the inconvenience of continually refilling oil cups. A cooling chamber at the head of the compressor provided with ample surfaced dissipating fins, is the principal heat reducing factor.

As the compressor is adjusted to 150 lb. pressure the motor is automatically started by a self-operating switch. This same switch also stops the motor when the pressure registers 200 lb. A provision has also been made to prevent the possibility of overloading the electric current, when the motor is started.



Electric Compressor for Inflating Large Tires

The outfit is furnished with an air reservoir tested to a capacity of 400 lb., pressure gage, a safety valve, and 25 ft. of hose with the necessary fittings, piping and wiring. It sells at $500.

An innovation in the construction of this air compressor is a whistle at the top of the tank. A blast from this whistle indicates the need of replenishing the tank with more air.

The carriage is so provided that lugs can be used to quickly convert it into a stationary tank outfit by removing the wheels and handle.

Fabric Fan Belt

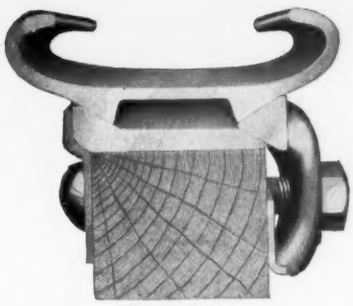
The Durkee-Atwood Co., 707 N. 3rd St., Minneapolis, Minn., is now producing the Rie Nie Fabric Fan Belt. This belt is featured by the fact that it is built of a number of filler plies, which are wrapped with an outer ply to prevent steam or water from getting in between the filler plies and causing separation. The company states that it has suceeeded in compounding a friction for the fabric used in these belts, this being oil and waterproof and heat-resisting. The fabric put into the belt is run through a series of rolls to give the necessary tension so that all permanent stretch is removed.



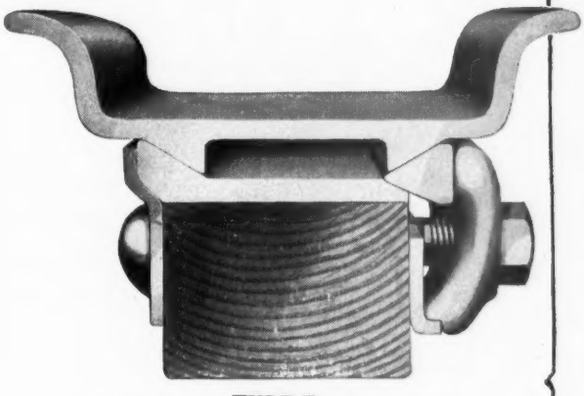
Rie-Nie Belt

This illustration shows an enlarged view of the new Rie-Nie Fabric Fan Belt. which is built of numerous plies and wrapped with a narrow ply to protect it.

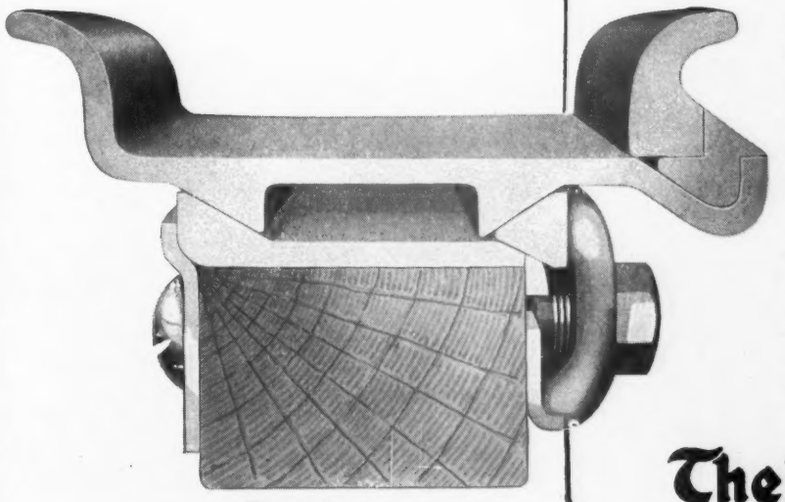
Firestone RIMS



Type F
Continuous base Demountable Rim for 30 x 3½ clincher tires.



TYPE E
Split base Demountable Rim for passenger cars. For straight side tires only.



Type C
Continuous base Detachable, Demountable Rim for passenger cars and trucks. This type of rim in the 6-in., 7-in., 8-in. and 10-in. size is the rim which has made the use of Giant Pneumatic truck tires practical. For straight side tires.

—quick detachable

—demountable

—no complicated parts

—no squeaking

—accurate alignment

—continuous bearing on felloe band

—continuous wedge ring support

—The supremacy of Firestone Demountable Rims is evidenced by the fact that they are standard equipment on the majority of high class passenger and commercial cars now manufactured. Firestone Type C Rims for trucks have put speed and greater mileage into trucking.

—There is a Firestone Rim for every kind and size of tire and for every type of service. See the Firestone Rim dealer or write for facts.

The Firestone Steel Products Co.

FIRESTONE PARK AKRON, OHIO

A Device to Elevate the Timer of the Ford Car

A new device, the purpose of which is to raise the timer and wires up from where they might become saturated with oil or water, has been brought out by the Milwaukee Air Power Pump Co., 886 Third St., Milwaukee, Wis. It is known as the "Stay Clean" Timer and sells at $6.



Ford Timer Elevator
With this device the timer can be raised to a position where it can be easily cleaned, inspected and repaired

The timer extension body is cast iron and the shaft is cold rolled shafting. The mitre gears are phosphor bronze. The other parts used in the timing system are the standard parts of the Ford car. With this device the timer can be raised to a position where it can be easily cleaned, inspected and repaired. To attach it is necessary to remove the timer and place the extension shaft in position. The timer is then fitted on top of the device. The bevel gear of the extension fits the other bevel gear, which is installed where the timer was located.

Shock Absorber for Ford Truck

A new shock absorber designed exclusively for the Ford one-ton truck is the recent production of the Halladay Co., Streator, Ill. The ability of this device to shift the load on either the outer or both outer and inner supplementary springs, not only enables the truck to run with far less vibration when carrying a light load, but absorbs and withstands much of the shock and weight of heavier than 1000-lb. pay-loads, that to a great extent would ordinarily be transmitted to the chassis direct.

This shock absorber is unusually large and rugged. The price per set of four is $35 and the total weight, boxed for shipment, is 55 lb.



The New Halladay Shock Absorber
This new model of the Halladay Shock Absorber is made especially for the Ford one-ton truck. Each of the rear ones consist of two springs, one within another.

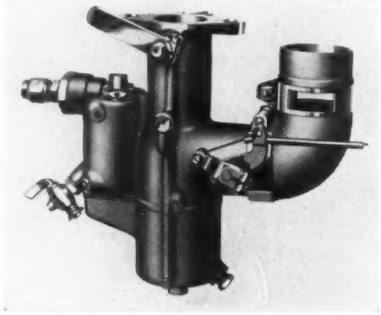
A New Rayfield Model for Trucks

The Rayfield Model O carburetor is designed for use on heavy-duty engines. It is made by the Beneke & Kropf Mfg. Co., 21st and Rockwell Sts., Chicago, Ill.

The carburetor is of concentric float construction with venturi tube and air jet. The float mechanism as used in this carburetor is of the fulcrum lever type and provides a positive method of controlling the flow of fuel into the carburetor.

The float chamber is directly below the mixing chamber so that any condensation returning from the manifold flows back into the float chamber. This eliminates leaking and flooding.

Two fuel levels are employed; the gas first enters a reservoir, then it rises to the top of the standpipe and flows into the float chamber proper where the float controls it. When the level in the float chamber reaches the desired height, the needle valve is closed.



Rayfield Model O Carburetor

Two nozzles are used, one for fuel feed at intermediate speed, supplied by the reservoir. The other nozzle is supplied by the float chamber proper, which cuts in at intermediate and high speed.

Acceleration is obtained by an accelerating well in the reservoir, and when the accelerating well is drained, air is "bled" through this well with the fuel.

Both the intermediate jet and the high speed jet are constructed for the use of air bleeders, that is to say, air is "bled" in with the gasoline before it reaches the nozzle outlet.

There are two adjustments, one a low-speed or idling adjustment, and the other an intermediate or high-speed adjustment. Idling gas passes through the throttle shaft when the nozzle is closed. When the throttle is opened, it acts as a valve and gives out this gas at intermediate or high speed, or as soon as the throttle is at more than one-quarter opening.

An air-valve choker is used for starting, that is, all air is cut off and a high velocity obtained in the nozzle for starting. Both nozzles provide ample fuel for this purpose. After the engine is started the choke, of course, can be closed off until about one-third closed.

Blazer Spark Plug

The Auburn Ignition Mfg. Co., Inc., Richmond, Ind., manufacturers of the AIM line of spark plugs, which includes the Auburn, Long Henry and Blazer Plugs, is using the No. 775 stone core in its Blazer Plug. This was developed by the U. S. Government chemists and engineers for aeroplane work.



Blazer Spark Plug Was Developed for Aeroplane Work and Stands an Unusual Degree of Heat

The electrode of this Blazer Plug is of a high grade nickel wiring which is cemented in the top of the insulator to prevent leakage. An expansion chamber is left in the bottom half of the insulator to allow for expansion of the electrode without splitting the core. The Blazer Plug is finished full polished copper and is made in all types for all engines.

The Radd Spark Plug

The Leich Electric Co., of Genoa, Ill., is manufacturing the Radd Spark Plug, which is featured by its auxiliary electrode. This construction gives two gaps for the spark to jump. The auxiliary electrode is located on the end of the porcelain insulator. It is a small metal cap with a star-shaped hole through which the center wire or center electrode passes. The metal cap is made of nickel alloy to stand extremely high temperatures. Thus when the electric current is directed through the spark plug, it must jump from the center to the auxiliary electrode and then to the outer electrode, producing a larger and hotter spark. The maker states that good material is used throughout and that the plug is guaranteed to be free from mechanical or electrical defects and defects in material and workmanship. The price of the plugs is $1.25 each. They are made in the ½-in size; also ⅞-18.

ROSS STEERING GEARS

Motor Trucks Equipped with Ross Steering Gears

297 [redacted]

Nearest Competitor Ross Nearly 5 Times as Many

65 [redacted]

Next Competitor Ross Nearly 6 Times as Many

54 [redacted]

Next Competitor Ross Over 8 Times as Many

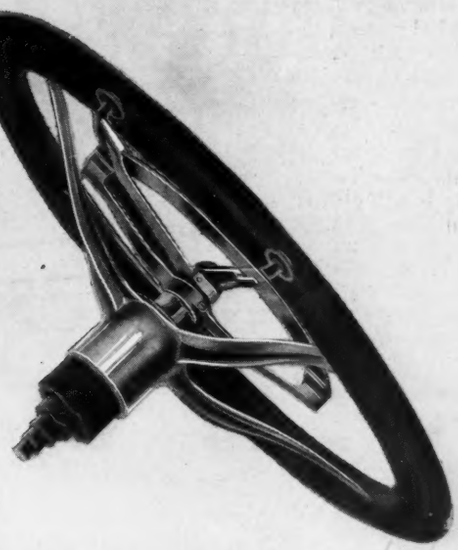
37 [redacted]

5 Other Competitors Ross Eleven Times as Many

27 [redacted]

Trucks Listed but Steering Gear Equipment Not Given

11 [redacted]





THE Commercial Car Journal for November 15, 1919, contains complete specifications of 526 different motor-truck models. On 35 models the manufacturers use their own steering gear. Ross Steering Gears are used on 297 of the 491 models that are open to competition. The chart above, drawn to scale, shows graphically the extent to which Ross Steering Gears Predominate on Motor Trucks. These figures have a vital significance for every man who manufactures or who buys a motor truck.

Write for further information about the Safety, Reliabiitty, and Easy Operation of Ross Steering Gears.

Ross Gear & Tool Company
760 Heath St., Lafayette Ind.

THE STEERING GEARS THAT PREDOMINATE ON MOTOR TRUCKS

Truck Development at French Automobile Exposition

By OUR EUROPEAN CORRESPONDENT

THE Paris automobile exposition has certainly produced nothing very startling in the commercial truck line. Indeed so small was the total exhibit that it was accommodated in the Grand Palais along with the private automobiles, instead of forming a separate and specialized display at des Invalides, as in years past. The French show indeed very strongly emphasized the fact that, except for the creeper tractor, a few examples of which were staged by such firms as Renault & Peugeot, the auto truck in its main essentials existed before the war much as it does today; its improvement has only been in details and dimensions, which are little noticeable in proportion to their importance.

Yet taking a broad view of the exhibit as a whole, there emerge certain facts that are instructive, if not significant. The most striking of these is that there was not a single worm driven live axle truck, or even light van in the show. Neither do the Continental makers favor the double reduction bevel live axle, —a type fairly well developed in Britain— for no example of this transmission either was in evidence. All the trucks were driven in their final transmission stages by side chains, ordinary bevel live axles, or by bevel driven jack shafts with pinions at their ends driving gears on the back wheels. Of this last drive there were two types, the de Dion, with the jack shaft suspended from the chassis frame and driving to the wheel gears through universal shafts, to take up the movement of the springs; the other, as in the S. C. E. M. I. A. or S. O. M. U. A. chassis (the two are identical, being made by Schneider, and familiar on the Paris omnibuses) in which the jack shaft is included in the back axle casing.

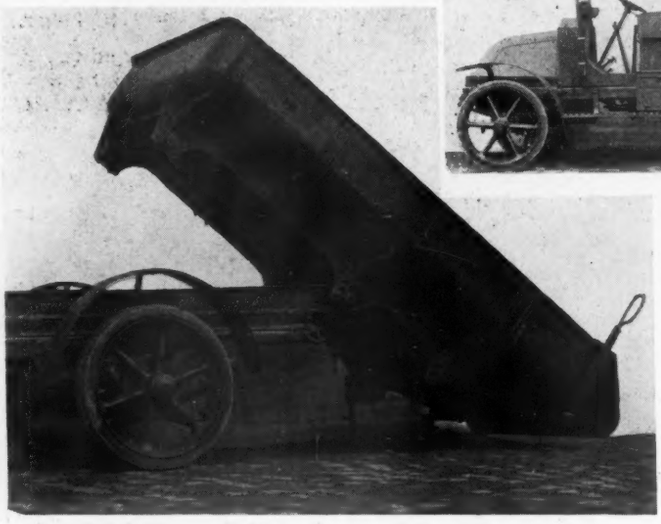
On the whole the French still prefer the side chain final drive.

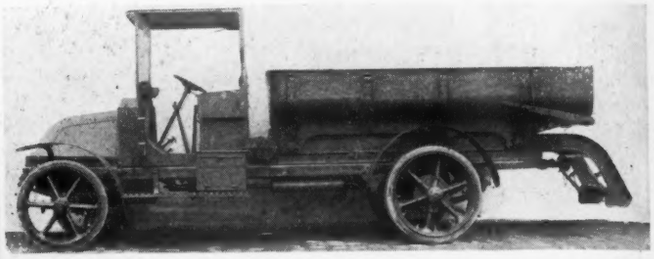
Among the bevel transmissions there is one important exception, namely, the new 3-ton Atlas chassis which is designed with a double bevel transmission much on the lines of the 2½-ton British Austin, which has already been described in the COMMERCIAL CAR JOURNAL. That is to say, the final gear in the gear box operates two propeller shafts led backwards to the rear axle at an angle, so that each drives by bevel a short shaft carrying a spur pinion that meshes with a gear on the back wheel. Thus each wheel rotates independently on a fixed back axle, as in the de Dion and Schneider types.

New Saurer Live-Axle Three-Tonner

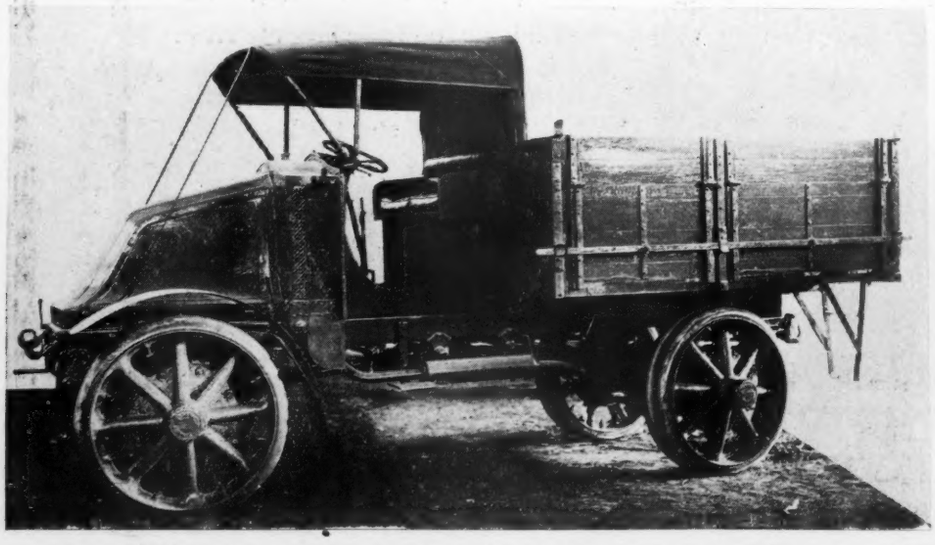
In considering bevel drives, the most notable individual exhibit brought out by the French display is the new bevel driven live axle 3-ton chassis by Saurer. It is rather a surprise to find this firm, so pre-eminently successful with the side chain, making such a drastic move, but it is only to please all tastes. Certainly the new live axle chassis is a strikingly fine machine, alike in general conception and in detail. Not only is it arranged for electric lighting and engine starting, but the gear box is so designed that an engine worked shaft can be led from it either transversely or longitudinally to be used for loading or other heavy work while the vehicle is stationary.

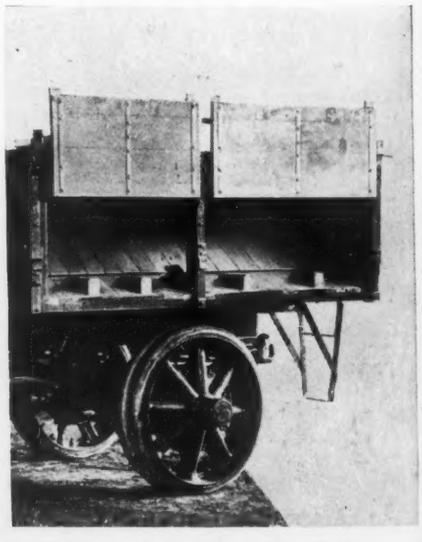
This Design is Particularly Adaptable for the Transport of Autos and Other Wheeled Loads





Sometimes the Curve at the End of the Sills, in Bodies of This Type, is Modified so That the Rear End of the Body Can be Slid Down to the Ground, so That the Floor Body Constitutes a Ramp Up Which the Load Can be Drawn.





Renault Truck With End-Dumping Body, of Which There Were Several Examples at the Paris Show. A Side-Dumping Body Like This, With an Inverted "V" Floor is Very Popular in France

SIVYER S CASTINGS

The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Sivyer Steel Rear Axle Housing used on worm drive trucks



Secondly: Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly: Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly: Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merits in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

TO keep unsprung weight at a minimum, rear axle housings are designed with thin metal sections. Because of the continual shocks, heavy jolts and vibrational stresses to which these housings are normally subjected in truck service, they must be free from strains and proof against crystallization and failure. Many castings made by ordinary methods have a tendency to draw and crack in cooling, due to the difficulty in getting the metal to run uniformly in the thin sections. Devised by Sivyer, special methods of heading, gating and of mixing and molding the core sand overcame this difficulty. Moreover, the thorough Sivyer heat-treatment, the notable strength and crystallization-resisting properties of Sivyer Electric Steel provide castings certain to be unaffected during the life of the truck. Such metal merits as these have won for Sivyer Castings their national market.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

The French seem more disposed than previously to utilize their engine power for subsidiary purposes. It is surprising how much this possibility has hitherto been neglected by European designers, though this neglect is possibly in large measure due to general external and warehouse arrangements militating against the use of engine power for loading, etc. In part this increased use of the motor when the vehicle is stationary can be traced to military requirements. In war work the capacity of a machine to haul or wind itself out of shell holes or soft ground is a great asset, and this accounts for the numerous capstans and winding drums seen on such chassis as the Renault, Latil and Saurer. These of course, are placed at the back of the chassis, and almost invariably were worked by a long shaft from the gear box.

Differential Locks Wanted

To the same influence also may be traced the arrangements for locking the differential. The S. C. E. M. I. A. and S. O. M. U. A. were thus provided with differential locks. They are wanted on heavy gasoline trucks: practically every steam wagon in England is fitted with them and they often come in useful.



This Military Truck by the Aries Firm Illustrates the Very Strong Tendency Towards the Disk Wheel, Which Was Much in Evidence at the Paris Exposition.



On This Tractor Only a 15 Horsepower Engine is Used Even for Five-Ton Trailers, Thanks to the Adjustable Height of the Drawbar Coupling

Curiously enough for dumping, motor power is not extensively used. There were two examples of hydraulic gear—the one an end tipper on the Dewald stand, the other a side dump Exshaw steam wagon—both with the cylinder under the body. The only other type of power dump was on an Aries five-tonner, and in this the lifting screw was turned by a short longitudinal bevel shaft driven through a short belt from a gear box shaft.

The absence of power worked lifts is probably due to the popularity of the existing hand worked gears, and to the fact that bodies complete with gear can be obtained from firms that specialize in their manufacture. Of one such type there were several examples evidently by the same maker.

Municipal Demand Evidently Strong

The number of dumping and tank trucks for municipal and such like work was noticeable, and nearly all the latter were provided with rotary pumps that could be operated from the gear box by a simple chain drive.

Low Powered Traction

Of road tractors, as distinct from farm tractors, there was only one example, by Chenard & Walcker, but this attracted attention because of its small motor: it was of only 15 hp. It was claimed that this small power was amply sufficient for the big 5-ton trailer to which it was hitched owing to the adjustability of the height of the F. A. R. drawbar attachment on the tractor, the coupling being traversable up and down along a vertical screwed pillar.

The Influence of War

Naturally the military aspect of the auto truck was much in evidence, and a number of army wagons and ambulances were to be seen, but there was little variety or novelty about these vehicles. The most instructive examples of military influence were to be seen in the chassis details. For instance, four speeds are now general, although before the war many of the French makers favored only three. Then too, on the springs, which gave more trouble than any other part under war conditions, the master plate was in several cases duplicated right up to the eye, for it was so close up to the eye that many a spring broke and was thus rendered inoperative.

Talking about springs, it was very noticeable that many designers are now shackling the leading springs at the front and anchoring them at the back, following the practice that the de Dion firm have adopted for many years. This certainly gives advantage to the steering.

Among the passenger vehicles there was little to note, except the excellent finish of the bodies and the apparent demand there is in France for good sized hotel omnibuses.

Behind in Deliveries

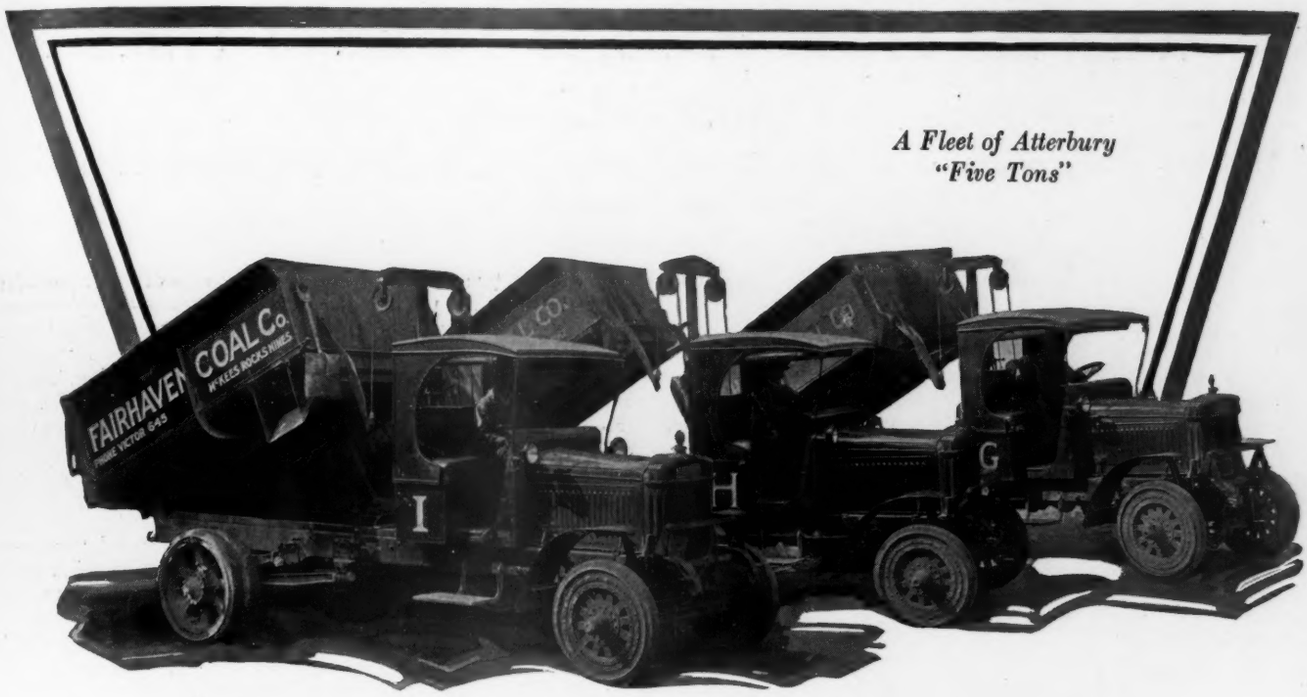
Taken as a whole the French exposition of 1919 must be recorded as disappointing from the commercial car point of view, but this is not surprising in view of the tremendous demands that the last five years have made on the economic vitality of the nation, and to the consequent great difficulty that the French makers are experiencing in giving deliveries. In fact, it showed great enterprise under the circumstances to hold a show at all.

Prepare-for-Winter Warning

The Auto Car Co., Ardmore, Pa., anticipating the damaging result of freezing weather to trucks through lack of necessary precautions, negligence or ignorance, is doing an immense amount of good toward preventing unnecessary repairs by sending out warning cards to all Autocar users. This card not only cautions the owners of the danger of freezing but also gives the following anti-freeze prescription:

Fill radiator with water as usual; then drain off six quarts of water through pet cock in bottom of radiator. Then pour six quarts of denatured alcohol into radiator. This solution will prevent freezing down to five degrees below zero. Should the temperature fall below this point, replace seven and one-half quarts of water with an equal amount of alcohol. As the alcohol evaporates faster than water, it must be added daily to keep the mixture up to full strength. Total capacity of cooling system is eighteen quarts.

If the car is not supplied with an anti-freeze solution and the engine should stop on the road, the water should be drained immediately while making repairs or waiting for assistance. To drain off all the water, open pet-cocks under each cylinder.



A Fleet of Atterbury "Five Tons"

"The Atterbury sells itself"

That is what dealers say about this real motor truck

TALK with any Atterbury dealer anywhere—and you will hear the same story.

"Atterbury trucks are their own best salesmen"—is the way one prosperous dealer puts it.

That's why Atterbury territory is snapped up as fast as the factory can handle it.

That's why you can't pry a dealer loose from the Atterbury Franchise once he has it.

1½, 2½, 3½ and 5 ton.



To meet the demand for Atterburys, we are nearly doubling our floor space. You may be able to get a dealership if you act promptly.

ATTERBURY MOTOR CAR COMPANY, BUFFALO, N. Y.

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

What the Traffic Manager Thinks of Truck Transportation

Delivery of Shipments on Schedule Time Predominating Feature. Eliminates Excessive Handling. Saves Time

By J. W. COTTRELL

THE American Motor Freight Corp., of 710 Arch St., Philadelphia, Pa., are operating a very successful truck service between New York and Philadelphia, Pa. In collecting information about their business the writer found that they were carrying shipments from Philadelphia to New York of three internationally advertised products. They are Victor records made by the Victor Talking Machine Co., Camden, N. J.; Whitman's candy and chocolate made in Philadelphia by Stephen F. Whitman & Son, Inc., and tooth paste and dental appliances made by the S. S. White Dental Mfg. Co., Philadelphia, Pa.

In interviews with the traffic managers of each of these concerns, the writer in an endeavor to learn authoritatively the real reasons for their using truck service to New York in preference to other means of transportation, obtained valuable information as to the conditions necessary for the successful use of trucks for both intercity and local service. The information here given, which is founded upon several years of experience with truck transportation by these concerns, may be helpful in directing efforts to sell trucks or, to sell truck hauling service, into lines where there is the best chance for results.



A Five-Ton Mack Truck Operating in Philadelphia-New York Transportation Service

The Victor Talking Machine Co. is shipping all records to New York by the American Motor Freight Corp. trucks. According to Mr. T. A. Reed, traffic manager for the Victor Co., "The reason for the use of trucks is the saving of time. Freight service is much slower than formerly and is very uncertain."

Delivering "His Master's Voice" on Time

New Victor records are put on sale all over the United States on the first day of the month. This fact is advertised and the delivery schedule must be worked out to meet the requirements set by this advertising. Not only must every dealer in the country have the records ready for sale on that day but it is also required as a matter of fairness that every dealer in a given city receive the supply on the same day.

Owing to innumerable causes, principally those precipitated by the war, such as unstable labor conditions and fluctuating markets, it has not been possible to keep the manufacture of the records much ahead of the latest possible shipping date. Shipments to distant points are made by freight as soon as possible. As a result, the records intended for New York are often not ready until the 20th to the 23rd of the month. This date makes freight shipments quite impossible.

By using the service of the American Motor Freight Corp. records are sent from Camden at night and are delivered to their destinations in New York the following morning.

During this short shipping period at the end of the month there is a very large increase in the volume of shipments. A shipment of 10,000 lb. one day may be followed probably the next day by a shipment of 100,000 lb. Although shipments are made almost daily the "peak," the period of maximum freight congestion, exists between the 20th and 25th of each month. The skill and efficiency in which this peak is handled by the freight corporation is explained later.

The Victor Co., itself, has a large fleet or trucks and trailers but these are utilized entirely for carrying incoming and outgoing Camden freight. They are also used for inter-company hauling. The large size of this plant, which covers several city squares, demands some such method of transportation. Shipments to Philadelphia, across the Delaware River from the plant, are made by trucks belonging to local "teamsters;" this hauling is usually arranged by the customers.

The utilization of trucks and trailers for inter-company work is considered invaluable. The hauls are extremely short, in many cases only a few hundred yards, and there is constant loading and unloading. The trucks hauling loads between buildings act somewhat like shifting engines in a railroad yard, moving a trailer into position alongside a platform and going after another one while the first is being loaded or unloaded as the case may be.

The equipment consists of twenty-two 5-ton Pierce-Arrow trucks, eighteen 7-ton Troy trailers and six 5-ton Troy trailers.

The Victor Co. has its own garage and service station for trucks and trailers. The maintenance plan is to use 21 of the 22 trucks and keep one in the shop. The one in the shop is given a thorough mechanical inspection, weaknesses are remedied, breaks repaired, parts adjusted and then repainted, varnished and put back into service. The resulting vacancy in the shop is immediately taken by another predesignated truck. This plan keeps the trucks at all times in good mechanical condition and the general appearance of the truck is always excellent. The trucks are cleaned every day, even the engines being wiped off and bright parts rubbed up. The "spic and span" appearance of Victor trucks is sure to attract attention.

Although the Victor trucks do not, ordinarily, do any long distance hauling they have made on several different occasions long trips to get parts for power house equipment. Saving of time during a breakdown in a power house has a value quite evident.

S. S. White Dental Manufacturing Company

The S. S. White Dental Mfg. Co., 211 S. 12th St., Philadelphia, Pa., manufacture tooth paste and appliances for the dental trade. Their factories are located in Princess Bay, Staten Island, and in Philadelphia. All of their goods to be delivered to New York from Philadelphia and to Philadelphia from the Staten Island factory are hauled by the American Motor Freight Corp. The shipments from Philadelphia to New York average about



JAMES CADY EWELL

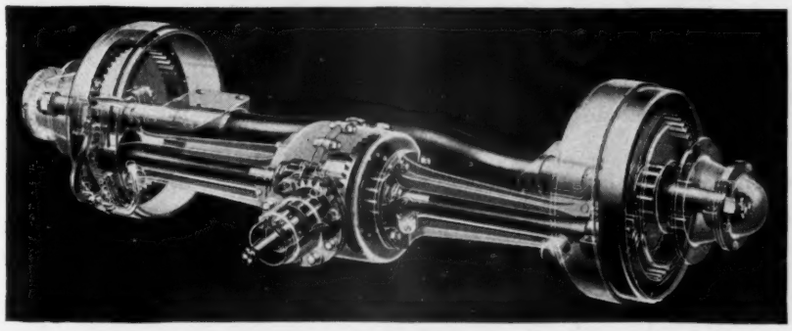
SPRUNG WEIGHT

All the weight above the toes is *sprung weight*—nature made it so. In truck construction sprung weight is a prime consideration, as one pound under the springs is as ten pounds above the springs. A five-ton Clark Axle is 700 lbs. lighter than other type axles of similar capacity—a saving of 7,000 lbs. on the pay load.

Clark Steel Disc Wheels make good motor trucks better—for solid or pneumatic tires

CLARK EQUIPMENT COMPANY
BUCHANAN, MICHIGAN

DIANA: Light of foot, lithe of limb, clear of eye, Diana the huntress typified to the Greeks, speed, accuracy, lightness, and agile strength in contrast to the heavy-muscled Hercules whose powerful form was built to lift and hold but not to carry—Diana exemplified the co-ordination of sprung weight and enduring strength.



Exhibiting at
Chicago Motor Truck Show
January 24 to 31, 1920
Boston Motor Truck Show
March 13 to 20, 1920

CLARK
Rear Axles-Steel Wheels-Locking Differentials for Motor Trucks
EQUIPMENT

CLARK INTERNAL GEAR DRIVE MOTOR TRUCK AXLES

2000 lb. per day and from Staten Island to Philadelphia about 4000 lb. per day.

This concern also uses truck service to save time. The cost of shipping by truck is slightly higher than by freight plus the local delivery charges but the truck service is much quicker and **more certain.** The company does a large export business, maintaining a warehouse in London. Export shipments go through both Philadelphia and New York. A shipment going via steamer must reach the dock on time. Truck service has been a decided advantage in arranging export shipments. Mr. Witherdem, the traffic manager, states, "Shipments can be made by truck with the assurance that they will arrive at destinations promptly at the time scheduled."

Did some one doubt the reliability of truck transportation?

For local city delivery two Ford touring car chassis with delivery bodies and a ¾-ton Reo delivery car are used. The entire delivery area in the city is covered twice a day according to a definite schedule. This schedule is advertised to the trade and a customer sending in an order can tell just about what time it will be delivered. This feature is much appreciated by customers and could be more generally used to reduce the number of requests for "special delivery."

Local freight both in and outbound are hauled by horse and wagon, hired on contract. The shipping department is located within a short distance of the piers and railroad stations. "The short hauls and the waits at the platforms are handicaps to truck operation for this work," states Mr. Witherdem.

Whitman's Chocolates

All shipments of candy and chocolate from the factory of Stephen F. Whitman & Son, Inc., 435 Race St., Philadelphia, to New York have been made by truck for the past four years. There is a seasonal variation in the volume of shipments in addition to the daily heavy shipments. In a busy time from one to three 5-ton truck loads go out every day. A much smaller amount of freight is carried from New York to Philadelphia consisting mostly of beans.

The company has a warehouse in New York so the saving of time by trucks is not quite so important to this company as to other shippers. But they have a very large export business most of which goes through the port of New York. Being able to start a shipment at night and know that it will be delivered at pier or warehouse or store in New York the next morning is an advantage which no traffic department will overlook.

Shipments of Whitman's candy cost about the same by truck as by freight plus local delivery charges in New York. But aside from the uncertainty of freight movements the local delivery of freight in New York is often subject to delays or interruption. The marked advantage of shipping by truck direct from loading platform to customer's receiving platform without handling, was shown during the teamsters' strike in New York. The strike resulted in a freight embargo but truck service was continued throughout strike.

During one freight tie-up in New York Whitman's chocolates labeled for New England cities were sent by truck to stations just beyond New York and reshipped by freight or express to their destination. By this plan shipments starting from Philadelphia actually reached Boston sooner than shipments originating in New York.

Rate Card

AMERICAN MOTOR FREIGHT CORPORATION

Philadelphia Office
710 Arch Street
Market 201 - 1024 Main 1879

New York Office
11 Washington Place
Spring 8324 - 4637

1	to	25	lbs.	.50	cts.
25	"	50	"	.70	"
50	"	75	"	.90	"
75	"	100	"	1.00	
100	to	2000	"	1.00	cwt.
2000	"	4000	"	90c.	"
4000	"	8000	"	85c.	"
8000	"	10000	"	80c.	"

Bulk Goods 15c per cu. ft.

Special Prices on Larger Shipments and Contracts

Goods picked up and delivered Daily.

Local Hauling Solicited.

This Rate Card Devised by the American Motor Freight Corporation is Strictly Adhered to

For local delivery Whitmans use three Autocar trucks. Freight to and from the piers and railroad stations is hauled by horses.

American Motor Freight Corporation

And now, the organization which handles with satisfaction the New York shipments for these and other concerns!

The American Motor Freight Corp. is a co-operative enterprise consisting of owners of trucks who are also stockholders in the corporation. The Philadelphia office is at 710 Arch St., that in New York at 11 Washington Place.

A total of 16 five-ton trucks are owned by members of the corporation. These include Macks, Pierce-Arrows and Packards. Each owner takes care of the driving and entire maintenance of his own trucks, depending upon the corporation to arrange the loads.

The charge is $1 per 100 lb. including local delivery, with lower rates for quantities over 2000 lb. This compares with a freight rate of 33 cents per 100 lb. not including local delivery.

Trucks are run from Philadelphia to New York and from New York to Philadelphia every night.

To take care of the very large shipments of customers on certain days, particularly the Victor end of month business, trucks are hired. It takes no little planning to provide truck capacity for customer's requirements but the management is on the job and it is always put over somehow. One night 27 trucks left Philadelphia. This is 11 more than the total number of trucks controlled by the corporation.

Customers interviewed all agree that any demand within reason made upon the corporation is met promptly and adequately and that shipments almost without exception arrive at their various destinations on time. Shippers give these two factors as the essentials for securing business for truck lines.

Breakdowns are rare but when they occur arrangements are made at once to move the load without undue delay.

Several transportation companies have operated truck lines between New York and Philadelphia. Some have been successful and some have not. If the success of the American Motor Freight Corp. may be used as a guide the requirements for success are:

Points Worth Considering

1. A co-operative organization of individual truck owners giving the company a large carrying capacity and at the same time insuring individual attention and responsibility for each truck.
2. A management "on the job" at all times.
3. The selling of the service to concerns making large shipments all the time.
4. Taking care of all of a customer's business (be it large or small) no matter how much effort it may take to handle any one shipment.
5. Absolute reliability of service. The charge for truck service will often be higher than freight rates and the saving of time is the deciding factor.

Selden Closes Large Foreign Order

ROCHESTER, N. Y., Dec. 18.—The Selden Motor Truck Corp. announces that through its English representative, Gaston, Williams & Wigmore, Inc., it has closed one of the largest foreign deals on record. Wilbur F. Reynolds, vice-president of the company, on a recent trip to England, closed contracts for 1800 cars to be delivered in specified monthly quantities during 1920.

Mr. Reynolds also succeeded in closing dealers' contracts for agencies in Scandanavia, France, South Africa, Japan, Central and South America, as well as making the first sale of American motor trucks to Morocco.



Read how the manager of THE HOWARD REFRACTORIES COMPANY, Dorsey, Maryland, saved contracts by keeping his firm's busy trucks eternally on the job.

"BUT for 'NOBBY CORD' PNEUMATIC TIRES our trucks would have been useless last winter, as solid tire equipment invariably stuck in the mud before reaching our plant."

"Since July, 1918, 'NOBBIES' have served us under capacity loads of heavy fire brick and weighty materials and to date a slight nail puncture is the only sign of depreciation."

'NOBBY CORDS' mean—less operating expense—increased speed—reduction in mechanical repairs and vibrations—decrease in gasoline consumption—decrease in oil consumption—greater traction—elimination of breakages—less depreciation.

'Nobby Cords' Save in Every Phase of Truck Operation



Sales Turned Through Question Catalog

Method Used by a Mid-West Dealer to Eliminate Non-Essentials in Education of Salesmen, and Speed Up Their Development Into Effective Competitive Units

By FRANK REED

I WANT men on my sales force with a knockout punch. We believe in selling customers so they will stay sold, and back up our goods with service. A salesman eventually finds use for every bit of knowledge of motor trucks and road transportation that he can absorb. But in the course of expansion, and the changes that come to every force, we find we are continually engaging new salesmen. Until we began our question catalogue we had no logical plan for making sure that these men had the all-essential, 'the selling punch.'

"We found that we were constantly giving them expensive education without getting any return.

"Now, however, the men 'are there' with the selling arguments that sell trucks. If they are shy of information, we know it is on a non-essential from a selling viewpoint.

"Our men give a lot of credit for improvement in their income to our plan for learning from our customers, and interchanging information that we call our 'Question catalogue.'"

In this fashion the proprietor of a well known agency gave this general opinion of a plan he has been trying out for making the salesmen help themselves and each other along the road to bigger incomes for themselves and a bigger share of the district's business for their house.

Build Up Prospect's Strength to Buying Point

"The plan of the question catalogue is based on the idea of repetition. For this reason, the salesmen agreed in starting the plan to make a record of every significant question asked by a customer. By significant question is meant one, which, in the judgment of the salesman, had an actual bearing on the sale. Salesmen carried a little pad of card-index sized slips. After interviewing a prospect, or buyer, they jotted down each question on a separate sheet of the pad, with the date, name of inquirer, and their initials. Later they shuffled similar questions together and clipped or banded the slips.

Shows Up a Tricky Competitor's Clever Device

"At the weekly sales meeting each man answered to a call with the question that came up most frequently on his slips. When one question was found to be coming to the front in the experience of a number of salesmen, there was no doubt in the world about it, that it was a subject which it behooved us all to be ready for with a knockout.

"Just for example, I will tell you, if you will, in publishing slightly camouflage its reference to the particular part of the truck involved, how the plan enabled us to spot in a single week a device of a competitor who is very aggressive in pushing a cut-price machine which has newly come into this territory. There is one weakness of this competitor's machine that contrasts most unfavorably with a construction of the corresponding part which our experience has led us to adopt for strength. Ever since his arrival here we had been winning competitive sales by emphasizing this feature of our machine in our selling talk. We knew the competitor had been dodging it, saying it was unimportant when directly questioned. It was one of those things where there was simply no chance for an argument on the technical merits of the matter. Our people were properly protected in the construction, and our competitor, being one of the last in the field, simply went shy on this point.

"But let me tell you how the clever chap got some of our boys on the run.

"We had a little local show, and of course, with the machines stacked up for close comparison, our special talking point looked pretty good to us. But somehow every time we sprung it it fell flat. The boys told me so, and I suggested that we quit pushing it for a couple of days, and see what would happen. To our surprise, the question lists showed that some of the prospects were bringing it up.

"We got a friend from out of town to go around and get sold on the competitive truck, and here is what they sprung on him. They gave him the 'once over' and decided he was not a mechanical man. Then they said, 'Mr. Jones, just see how this truck is built. The only truck in the world with cotton flannel bearings. Just think of it, Mr. Jones. Consider how remarkable that is. Imagine the life and durability such a precaution assures you when you own this truck. Where is there any other manufacturer who has the technical skill, the enterprise, and the regard for the interests of his customers to equip with the famous cotton flannel bearings.'

"They began on that, and by suggestion actually had the nerve to 'sell' a certain class of good business men on their mush bearings. They put over a selling talk that made ours look like an excuse, the way we had been framing it. Of course we got busy and met the situation effectively. But our habit of listening to and recording questions of customers gave us a lead that must have saved several sales."

Mr. Salesmanager

Are you utilizing a Question Catalog in your sales organization? This article tells how the question catalog works out—how it helps the salesman get the selling punch, and how it enables you to train new men.

Standardizing and Clearing Question

In the practical working of the question catalogue, a device was adopted that prevented it becoming burdensome. In other words, it was safeguarded from becoming a system that choked itself with system.

The question slips were made detachable from pads, uniform card index size.

The sales meetings took up the questions occurring most frequently, and discussed, investigated, and interchanged opinion on each until every man was able to deliver a knockout argument for his product on this point. When they were all agreed that they were "getting away with it," in their contracts with customers, the question was "standardized and cleared." All cards bearing it were put away in a storage file for the purpose, and each salesman ignored noting it as it came up with future prospects.

The Repertoire for the Green Salesman

In this way the stuff that was live in the minds of all the men was shoved to the rear in the records, and no further labor was wasted on amplifying it. It had served one purpose, in revealing the importance of the topic, and leading to the concentration of all the brains of the organization on developing a knockout.

But the card record of "Standardized" questions was a unique help in outlining a training course for salesmen. By simply looking at it, the bulk of the sections showed the relative importance of various items of information. They showed, for example, whether more people were influenced by a talk on engine or rear

Faith in Fisk—It Pays!



OTHER truck owners dared not try—

but J. W. Smith & Sons hauled this beam sixty miles over the Sierra Nevada mountains, on Fisk Solids *and made money.*

For "the best that man can manufacture"—next time—BUY FISK

J. W. SMITH & SONS

Trucking & Freighting
Contractors

Redding, Calif.

August 20, 1919

Gentlemen:

Recently we were called upon to bid on a haul of an angle beam weighing six and one-quarter tons and a length of 60 feet. This was quite an undertaking, as it required two trucks to carry the beam.

The roads in most any direction are nothing more than hard old mountain roads, made up of twists, and turns, heavy grades and rocks which tax all the wearing parts to the utmost. They require the best in tires that man can manufacture.

J. W. Smith & Sons were the only bidders to come forward as the other truck owners could not see how money could be made after giving tires this abuse.

We hauled this beam for 60 miles on Fisk Solids and made money.

Yours truly,

(signed) J. W. Smith & Sons
By E. W. Smith

Extract from a letter by J. W. Smith & Sons of Redding, Cal., to the Fisk Rubber Company, Chicopee Falls, Mass.

FISK SOLID TIRES

end, how the subject of brakes stacked up as a factor in sales, and so on. The policy of training was to develop the new man as fast as possible on these vital points, and let him pick up the stuff around the fringes later. Of course, this is largely what many sales managers are doing. But in the case discovered and described above, a definite method was worked out, so that it could be followed in a way that gave the sales manager and other salesmen a key to just about how far the new man could be trusted. Furthermore, it gave something that was flexible enough to be adapted to the changing conditions of growth and development, the variation of the seasons, and new devices of competition.

This house had a live, enthusiastic group of salesmen, who seemed to be pulling together in good shape, and they were certainly getting the business. Was it their system? Or was it just the old, old story "The personality of the boss, and the kind of men he draws around him."

If you ask me, I'll say it was the combination.



Mansfield Standard Radiator Applied to a Seven and a Half Ton Mack Truck

The above illustration shows how the radiator guard, which affords particular protection for the magneto and other mechanism of a delicate nature in the front, swings down out of the way making easy access to parts under the hood requiring adjustment.

Trailers Used to Advantage in Celite Mines

THE facilities and conditions for transporting raw materials to various centers of industry from mines that are situated in the heart of mountainous regions are problems that have always been carefully considered and investigated before the operation of a mine is taken over. The success of a mine depends upon this very important issue, but now, with the increased capacity and ability of trucks and trailers, that which in the past would have been a dubious undertaking becomes a simple proposition.

Today the success of trucks and trailers in this particular line of work is strikingly evident in view of the many new mining centers constantly croping up throughout the country.

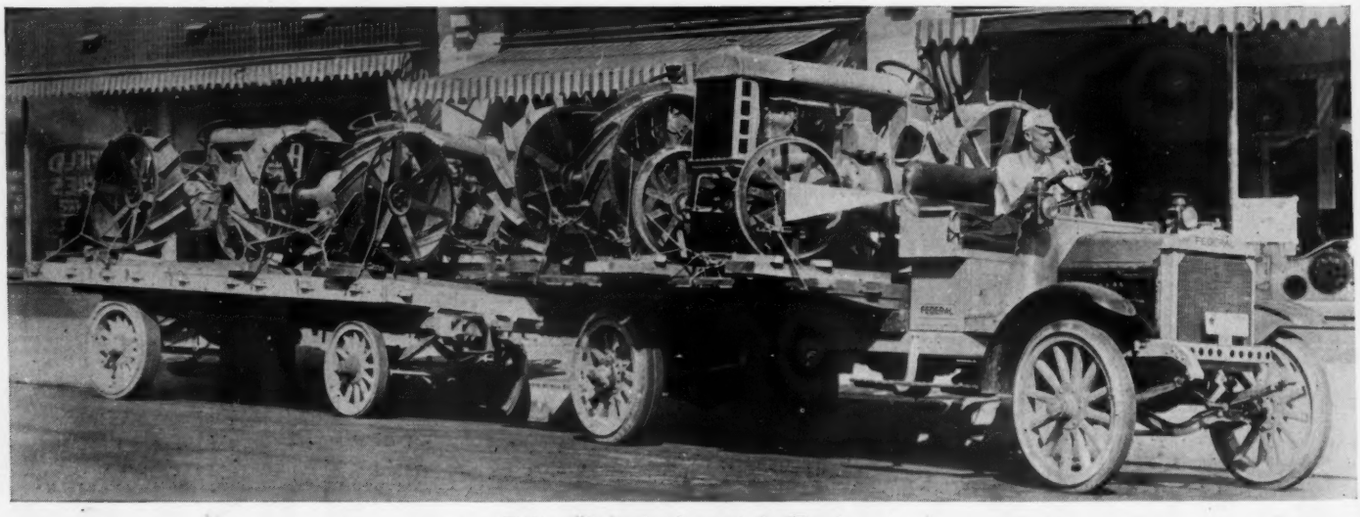
For example, the Celite Products Company, Los Angeles, Cal., appreciating the economy of both truck and trailer, is using them both and has come to consider them an indispensable factor in their business. This company uses two 5-ton Utility trailers with special built bodies 8 ft. wide, 5 ft. high and 20 ft. long which are drawn by 6-ton Packard trucks having the same style of body. This train is utilized for hauling bricks and Celite, a light powdered material used in insulating work, from the plant in the hills to a warehouse. These trailers haul 7½ tons a piece and four or five trips are made per day.



This Veritable Train Comprises a Packard Truck and Two Utility Trailers

These specially designed bodies give one the impression of a freight train wending its way through the hills when viewed from the distance. The bodies are constructed of light sides supported by steel frames and are unloaded by the manipulation of top hung doors that swing out when the body is rocked on the frame.

This company claims that it has never experienced any difficulty in getting over the hills and that the outfits have not only increased production, but have been also the cause of cutting the cost of transportation in the past year.

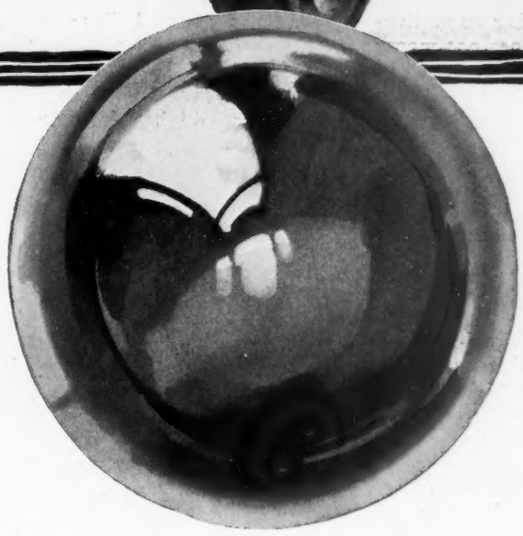


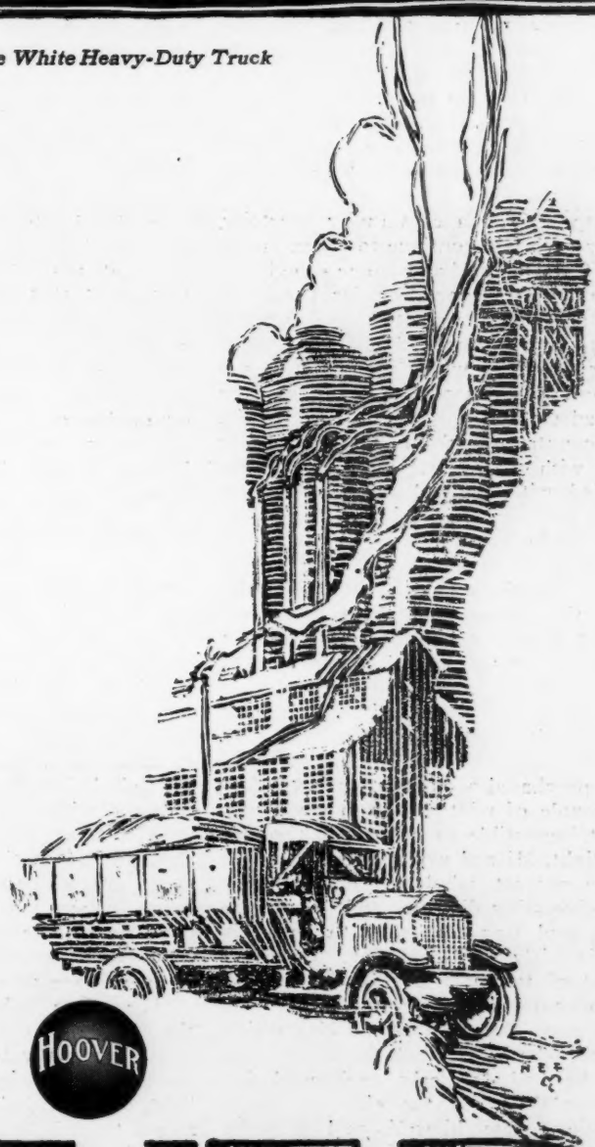
Deliver Farm Implements by Truck

Power farming dealers are utilizing the motor truck in making quick delivery to their buyers and in keeping that implement in service. Above is a load of Fordson tractors, mounted on a Federal truck and trailer, just leaving the salesroom of the Wm. L. Hughson Company, at Los Angeles, California



The White Heavy-Duty Truck





The Motor Truck must endure the strain and friction caused by rough roads and heavy loads. The stamina to continually resist these shocks and furnish the utmost power is provided, to a great extent, by ball bearings.

The perfect roundness and velvety smoothness of Hoover Steel Balls, used in ball bearings, help to cushion the road shocks and absorb the friction which causes loss of power and shortens the life of the unit.

They are used in the ball bearings that are in a multitude of the nation's most faithful servants.

HOOVER STEEL BALL COMPANY
ANN ARBOR MICHIGAN

HOOVER

HOOVER
STEEL BALLS

Selling the Country Merchant Trucks

By HARRY R. BRATE

YOU have heard the expression "overlooking a good bet," and while I hardly feel qualified to explain just what that might mean, I have certain ideas of the way it might be applied. I do know that there is an excellent market for trucks among the country merchants, and I am inclined to call that a fairly good bet, one which should not be overlooked. It is at least a most fruitful field and it should be developed.

Country Merchants Thrive

By the country merchant, I particularly refer to the fellow doing business in the little store located at the country cross-roads. In spite of the mail order competition, we read and hear so much about, regardless of the farmer going to town in his automobile with Mary and the children to do their shopping, notwithstanding all the difficulties and the odds he has to overcome, the country merchant still exists. He still sells anything from pins to brooms, and calicos to soap. He is a community necessity, and as such will continue to serve.

As Old Dobbin has become too slow a medium of transportation for the farmer to use when he wants to go to town, he has also become too slow a motive power for the country merchant to use in hauling his goods to and from the railroad station or other base of supply. The country merchant has kept fairly apace with the times. He is no longer satisfied with the old order of things, and so a large number of them have turned to trucks.

G. R. Millard, of Dundee, N. Y., is an example of the country merchant, who seeing the new order of things, prepared. At first, like many others, he started by converting an automobile into a sort of delivery wagon, but he soon realized that while it was a great improvement over the horse, it was not large enough to do what he really ought to be doing with it, so he purchased a one-ton truck.

A couple of winters ago, when it was almost impossible to get goods through by freight, Millard would drive his truck to the nearest wholesale house, some thirty-five miles distance, and bring back goods, and was thus able to keep his stock in fairly good condition. He learned that winter that the folks in the city were clamoring for country butter and fresh eggs. This gave him an idea, which was, that he would sell the butter and eggs he had formerly exchanged for groceries direct to the city consumer, marketing them himself, and that he would in the future purchase his groceries and other goods for his store trade for a return load. The city in which he secured his goods established the following spring a public market where the farmers and others from out of town could sell their produce direct to the customer. He rented one of these stalls, and today he is taking to the city as high as 1500 lb. of country butter and fifteen to twenty cases of eggs—thirty doz. to the case. He still continues to bring back his stock, thus making money on both trips. His weekly schedule is from one to two trips.

In the meantime, Bob, as his customers call him, uses the truck to carry stock and transport butter and eggs from another store he recently established in a town some eight miles from Dundee. He also uses it to deliver goods to the farmers in his locality, making four trips a week in the summer and one or two in the winter, each trip covering some thirty-five to forty miles. He does not worry about mail order competition, slow railroad transportation, or dishonest butter and egg commission merchants. The ways and means of the truck solved his problems. The farmer's wife has the goods delivered right to her door, the same as her city cousin, only she telephones her order the night before, as it is necessary for the truck to start early mornings.

In the South the country merchant is still flourishing as he has in years gone by, and the Welfare Automobile Co., Wilson, N. C., have been making a special effort to get that business. Just how strong they have gone after it is shown by the fact that they first went after the grocerymen in town and have them one hundred per cent. sold. That is to say, that every groceryman in the city of Wilson owns and operates a truck and some of them several.

Practical Demonstrations Convince Merchants

"The way we sell the country merchant a truck," said W. G. Barnes, "is to take a truck and go right out to the merchant's place of business and show him just how it can be profitably adopted to his own business. We will haul his freight from the station, or from the wholesaler in town, direct to his door, completing the job before he could get half way to town with his team. Some of these merchants are located many miles from the railroad station or town in which there are wholesalers, which means in many instances a trip from one to two days long. The truck is a revelation to him, and it doesn't take him long to see the advantage of owning one.

"We sell a light truck which is just the thing for the average road in the South, especially for the average country merchant as their loads are, as a rule, light, although bulky. But the only way to sell them is to go and show them just what it will do. You can talk without demonstrating until you are hoarse and it won't get you anywhere. Of course, the fact that the merchants in town, who we first sold, are finding the truck more and more indispensable, helps to convince the outside merchant that the truck was the thing for him. We also show him how it is possible for him to increase his trade by making deliveries, which in some sections was quite a novelty to the farmers.

"We also find that the farmers are taking to trucks fast, and we believe that the trucks in the hands of the country merchants have had a good deal to do with it. They see what the merchant can do with it, and then they want one to haul their tobacco into town, as the tobacco in this part of the country is all sold here. The fact that the farmers in this territory sold their tobacco crop for around twenty million dollars this year, leads us to believe that they are going to buy trucks; at least, we know that they have the money with which to buy them. Most of them already have automobiles—high priced ones too, and next comes the truck and the tractor."

Impartial Service

The Welfare Automobile Co. gives the same service to the trucks they sell in the country as they do to those sold in town. In both cases they request out of town owners to bring them in after they have been run five hundred miles, so that they can make a thorough inspection and make any necessary adjustments.

How Inter-Department Co-ordination Bears on Service

Co-ordination of selling and production departments so as to give the best service to consumers is something for which big industries all over the country are striving. Many corporations have formed departments whose particular duty it is to supply this vitally necessary link in their organization.

Such a department is in operation in the factories of the Firestone Tire and Rubber Co., Akron, Ohio. Engineers in this department are not only men trained in tire construction methods but are also versed in all the other various branches of the automotive industry. These engineers are always on the alert for devising new ways in which a product can be made more serviceable to the purchaser. They are everywhere at work in the field, studying performances of tires under various conditions, conferring with truck manufacturers and seeking to know the tire needs of their business, or in the factory applying the knowledge gained in the field.

A large fleet of test cars is operated by the company as a further source of information in this respect. It is always at work, units traveling in all sections of the country and under all sorts of conditions.

As a result of this work the department is in a position to supply the needed co-ordination between the production and sales organization of the company.

The Resiliency is Built in the Wheel



Here are shown eight of the Fleet of twenty-one Heavy Duty Trucks owned and operated by the Hudson Motor Car Company—all equipped with Sewell Cushion Wheels.



One of the Automotive Industry's Thirty-two Endorsers of

Sewell Cushion Wheels

The Hudson Motor Car Co. says:

"We purchased our first set of Sewell Cushion Wheels in 1914. The satisfaction given us by that first purchase has led us to equip twenty-one of our heavy duty trucks with Sewell Cushion Wheels. This record, we believe, is the best evidence we can offer of our satisfaction with our investment in Sewell Cushion Wheels."

Hudson is only one of the Thirty-Two large Automotive Companies who, by re-ordering Sewell Wheels, have approved the soundness of the Sewell Principle —"*The Resiliency is Built in the Wheel.*"

These Motor Car and Parts Manufacturers of International Reputation Have Re-Ordered Sewell Wheels:

Aluminum Castings Co.
Chicago Flexible Shaft Co.
Columbia Steel Shafting Co.
Cleveland Copper & Brass Company
Continental Motor Corp.
Delco Laboratories
Dodge Bros.
Everitt Bros.
Fisher Body Co.
Ford Motor Co.
Gemmer Mfg. Co.
General Aluminum Brass Company.
Hayes Manufacturing Co.
Hudson Motor Car Co.
Hupp Motor Car Co.
Ireland & Matthews
Kelsey Wheel Co.
King Motor Co.
Long Manufacturing Co.
Manhattan Rubber Co.
Maxwell Motors Corp.
Michigan Stamping Co.
Michigan Copper & Brass Company
Parker Rust Proof Co.
Penberthy Injector Co.
Stroh Castings Co.
Timken-Detroit Axle Co.
Union Drawn Steel Co.
Wagner Electric Mfg. Co.
Winton Motor Car Co.
Wire Wheel Corporation
Young, L. A., Industries Company, Inc.

The Reason

It is the Sewell Rubber Cushion, "built in the Wheel," supplying *everlasting Resiliency* that add many thousands of miles to the life of the truck tires; that reduces to a minimum repairs and replacements; that add years of actual working life to every part of the truck; that, in short, has made possible this nation-wide endorsement and supremacy. It can be stated in a few words.

Sixty per cent. of Sewell Wheels Sales are Re-Orders.

Such is Industrial America's acceptance of the Sewell Principle —"*The Resiliency is Built in the Wheel.*"

Sewell Wheels Can Be Applied to Any Motor Truck Without Changing the Design or Construction of the Truck

For Eleven Years We Have Been Building Resiliency into Motor Truck Wheels

The Sewell Cushion Wheel Company, Detroit, U. S. A.

Branches:

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Chicago, Ill.
Cincinnati, Ohio
Clarksburg, W. Va.
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Dayton, Ohio
Denver, Colo.
Detroit, Mich.
Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Calif.
Louisville, Ky.
Macon, Ga.
Memphis, Tenn.
Miami, Fla.
Milwaukee, Wis.
Minneapolis, Minn.
Newark, N. J.
New York, N. Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Oregon
Rochester, N. Y.
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.
Springfield, Mass.
St. Louis, Mo.
Washington, D. C.

Sewell Wheel Book to Truck Owners on Request



Trailmobile and Truck Carry Milk to Towns Fifteen Miles Apart

The Trailmobile shown is drawn by a two-ton pneumatic tired truck, governed to a speed of sixteen miles an hour. It is operated by the Galloway-West Company, Fond du Lac, Wisconsin; between Fond du Lac and Lomire, a twelve mile stretch over a hard surfaced but rough road, which runs over several bad hills.

At one end of the route it is necessary to back in about fifty feet to pick up the load and the Trailmobile has been found to be very easily manipulated for that purpose.

Under the new system this company, which had formely employed a two-ton truck costing $12 per day, not only completes the round trip in three hours but the Trailmobile is also utilized for various other runs, carrying sundry loads in the neighboring country. In the two months it has been operated the company figures that the Trailmobile has paid back its original cost.

A Grocery Store on Wheels

Bringing the "Grocery Store" to the home has proved a success and has been very acceptable to the housewife. Mr. Mosly, Pine Bluff, Aakansas, is responsible for it. He purchased a motor truck chassis and knowing the requirements of a grocer, being one himself, he designed a grocery-store body.

The interior of the car is ingeniously planned. There is a customer's vestibule, electrically lighted, a heater, a show case, counter, refrigerator, glass front display case, and a display of bottled goods. There are also open shelves with movable rods to keep the goods from toppling over. Everything carried in the "grocery store" is in packages, labeled and ready for sale. Most of the articles are Armour and Company's Oval Label brand.

A fixed route is covered by the car and is maintained as near to a time schedule as variation in quantity of purchases will permit.





A Napoleon One and a Half Ton Job Knocked Down for Export Shipment Carried by a Napoleon of the Same Capacity

The entire weight 8960 pounds was exactly balanced on the rear bolster thirty-eight inches back of the rear axle. This necessitated the additional weight of two men on the bumper to keep the front wheels on the ground.

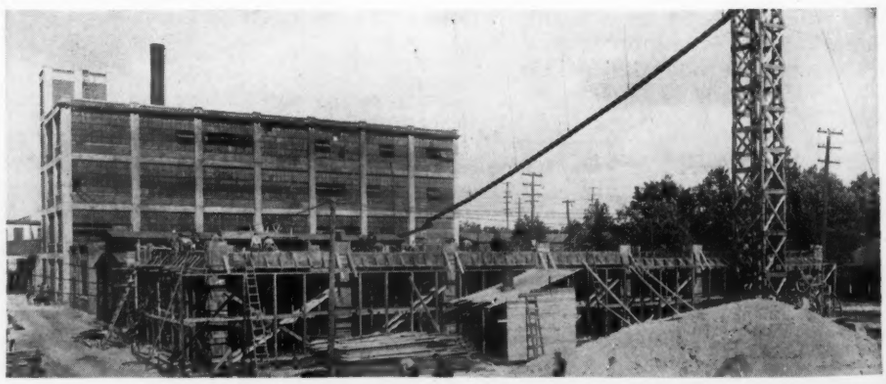
The Napoleon Motors Company, Traverse City, Michigan, is working on a shipment of one and a half ton trucks for London, England.

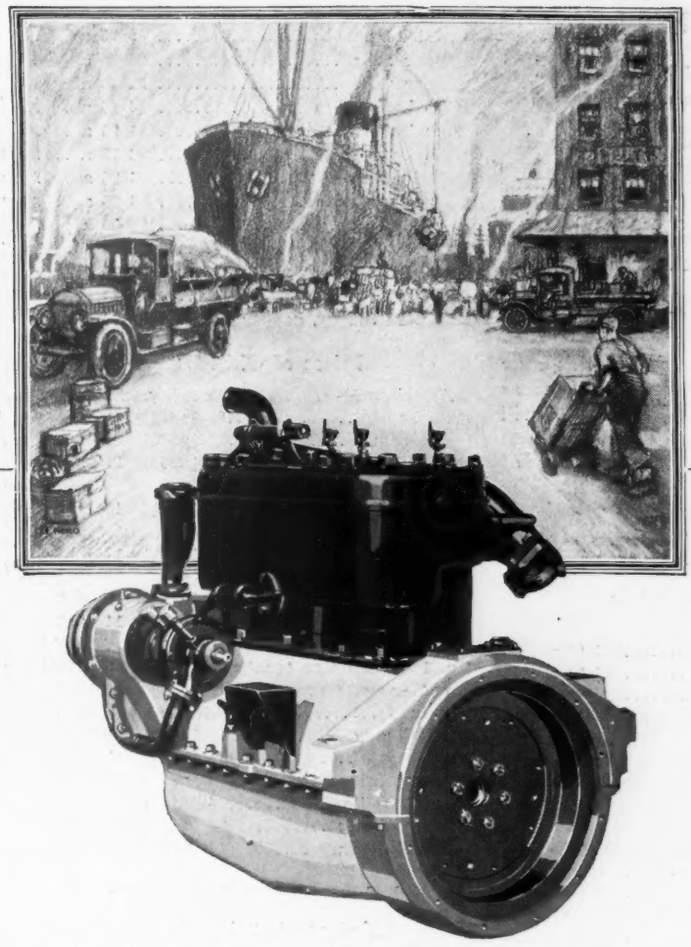
S. H. Rea, factory superintendent, is at the wheel; general manager, W. G. Rath, on the seat beside him; Mr. Arntz of the financial department is seated on the front of the box; while C. D. Peet, general sales manager is standing near the rear with kodak in his hand.

Piston Ring Company Expands

The Piston Ring Company, of Muskegon, Michigan, due to an increasing volume of business, has decided to expand its present plant with a new addition, which is already in its advanced stages of construction.

The present building expansion is another step in the progress of this rapidly growing concern and is the second addition of its kind in the past few years. The new additions will give the Piston Ring Company a capacity of over 125,000 piston rings per day.





The latest Buda engine features will be on view at the Chicago Motor Truck Show, Space 26-27-28; also at the Boston Truck Show, the Minneapolis Tractor Show, and the Kansas City Tractor Show. A really cordial welcome awaits you at the Buda booth.

In satisfying remarkably well the commercial transportion needs of the nation, the Buda engine has definitely fixed a high standard of quality engine performance in truck service.

Such Buda characteristics as staunch construction, reliable power, consistent mechanical satisfaction, have impressed upon owners and operators of Buda-equipped trucks the worth of a quality engine in meeting exacting haulage schedules.

Gradually and permanently, the good name of the Buda engine has grown, because of its ever-willingness to work, because of its minimum maintenance costs, and because of its record for punctual and profitable performance in trucks everywhere.

To have served well in the past is worthy assurance of ability to serve well in the future, a reason why trucks are so frequently sold on the basis of Buda engine installation.

THE BUDA COMPANY, *Harvey* (CHICAGO SUBURB), *Ill.*
ESTABLISHED 1881

BUDA
The
ENGINE

Metal and Rubber Markets

Heavy Steel Demand Expected Early in New Year

No new business of importance has been booked during the past few weeks and no great activity is looked for until after the New Year. All the mills are overcrowded with orders and it will be necessary to carry much of the tonnage over for 1920 delivery.

It is rumored that there is a heavy demand from the larger consuming industries waiting to be placed, but this may have to wait for, at present indications, as consumption of steel products is and will continue much in excess of supply. At present there is a general shortage of sheets, bar plates and wire products. The automobile industry is pressing for sheets and, due to the shortage, prices of independents are advancing.

Steel Products Prices

Per ton, Pittsburgh—	
Bessemer billets	$48 00 a ....
Open hearth	48 00 a ....
Forging billets	60 00 a ....
Sheet bars	50 00 a ....

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—	
Pittsburgh (base)	$3 55 a ....
Philadelphia	3 79 a ....
Chicago	3 82 a ....
Galvanized Sheets of Black Sheet Gauge—	
Pittsburgh	$5 70 a ....
Chicago	5 97 a ....
Tin—Mill Black Plate—	
Pittsburgh	$4 35 a ....

Tin Plate

Tin plate, per case box	$7 00 a ....
Terne plate, I. C.	14 10 a ....

Iron and Steel at Pittsburgh

Bessemer iron	$37 40 a ....
Bessemer steel, f. o. b. Pitts.	48 00 a ....
Skelp, grooved, steel	2 45 a ....
Skelp, sheared, steel	2 65 a ....
Ferromanganese (80%)	120 00 a ....
Steel, melting scrap	25 00 a25 50
Steel bars	2 75 a 3 00

Copper—The market continues quiet, but there is a strong undertone. Business is good for this time of year. Copper sold during the latter part of December for 18¾c and there is no indication of its returning to 18½c. The selling price has been set on the Metal Exchange for 19c spot during January.

Aluminum—The market is firm and active and past prices continue to be quoted. Virgin metal ingots, 98 and 99 per cent., are selling at $32 to $33.

Tungsten—There is little demand at present and prices range about the same as usual. Chinese wolframite is offering at $7.00 and Bolivian at $9.00. American scheelite could be had on December 30 at $9.00 per unit.

Other Metal Products

The following prices are current for brass and bronze products:

Copper sheets, hot rolled	28 50 a ....
Copper bottoms	37 00 a ....
Seamless tubing, bronze	34 50 a ....
Cut lead sheets	9 75 a ....
Copper rods	25 75 a26 50
Copper wire	21 50 a22 00
High brass wire	24 25 a ....
High brass sheets	24 25 a ....
High brass rods	22 75 a ....
Low brass sheets	26 25 a ....
Low brass wire	26 25 a ....
Low brass rods	27 00 a ....
Brazed tubing, brass	36 00 a ....
Brazed tubing, bronze	40 75 a ....
Seamless tubing, brass	30 50 a33 00
Seamless tubing, copper	32 00 a ....

Prices of Old Metals

	Buying.	Selling.
Aluminum—		
Cast scrap	22¼a23¼	25¼a25½
Sheet scrap	21¾a22½	24 a24½
Clippings	24½a26	27 a28
Copper—		
Heavy machinery comp.	14½a14¾	16¼a16½
Heavy and wire	13¾a14	15¾a16½
Light and bottoms	12½a12¾	13¾a14¼
Heavy, cut and crucible	15¾a16	17¾a18¼
Brass, heavy	7½a 8¼	9 a 9½
Brass, casting	10½a10¾	11 a12
Brass, light	5⅞a 6⅜	7¾a 8½
No. 1 clean brass turn'gs	8⅛a 8¾	8¾a10¼
No. 1 comp. turnings	11¾a12	13¾a14
Tea lead	4.50a4.60	4.87½a 5
Lead, heavy	5.76a5.87	6¼a 6½
Zinc, scrap	4¼a 4½	5 a 5½
Solder joints	9½a10	10½a11
New zinc clippings	5¼a 5½	6 a 6½
Pewter dishes	34 a35	38 a40
Block tin, scrap	46 a47	49 a51

Rubber Market Active Again

The lethargy that has been hanging over the rubber market for some time has been dispersed by the appearance of buying orders for large lots. These orders seem to have been influenced by cables from London, which stated a substantial advance in the price upon the opening of the market after a three days' recess.

Prices quoted December 30 were:

Para—Up-river, fine	47 a ..
Up-river, coarse	35¼a ..
Island, fine	47 a 47½
Island, coarse	21 a ..
Caucho, ball, upper	34½a ..
Caucho, ball, lower	29½a ..
Cameta	23½a ..
Plantation—First latex	54½a ..
Brown crepe, thin, clean	46 a ..
Rolled brown, crepe	42 a ..
Smoked ribbed sheets	54 a ..
Centrals—Corinto	34½a 35
Esmeralda	34½a 35
Guayule, wet	25 a 27
Guayule, washed and dried	.. a ..
Balata, block, Ciudad	76 a 78
Balata, block, Columbian	56½a ..
Balata, block, Panama	42 a 43
Balata, sheet	*1 00 a ..
Mexican—Scrap	34 a 35
Slab	.. a ..
African—Maresi, red	.. a ..

*Nominal.

Scrap Rubber—The market is devoid of interesting features, there being no business. Prices are nominal.

Tires—Automobile	3½a ..
Bicycles, pneumatic	2½a ..
Inner tubes, No. 1	.. a 17½
Inner tubes, No. 2	.. a 9½

The White Service Record

The White Co., of Cleveland, Ohio, has just issued a very attractive and interestingly compiled book in which is portrayed the military performance of White trucks in the service of the United States and the allied nations. It is entitled the "White Service Record" and consists of 55 pages of real live illustrations pertaining to all channels of government activities in which White trucks were utilized.

Acme Plays Santa

CADILLAC, MICH., Dec. 30.—The Acme Motor Truck Company entertained its employees and their families with a huge turkey dinner on December 27. The dinner was followed by addresses by some of the directors, and community singing, after which Santa appeared in a large Acme truck, which has proven much more efficient than the reindeer, and distributed gifts to everyone present. The dinner was given by the company in order to strengthen the good fellowship permeating the Acme factories and offices and to show its employees that the officers and directors of the company have more than a dollar and cent welfare in their interest.

Firestone to Prepare Rubber at Singapore

AKRON, O., Dec. 24.—According to plans recently revealed by the Firestone Tire & Rubber Co. it is going to erect a $1,000,000 plant in Singapore. This factory will be used to prepare the rubber for use in the manufacture of tires. At present all imported rubber is prepared at the Akron plant. Almost all of this is to be done in the Singapore plant as soon as it is completed. It is expected that this new method will result in large economies for the company, both from the standpoint of wages and the expense entailed in the handling and rehandling of the product. The new subsidiary will be known as the Firestone Tyre & Rubber Co. of Singapore.

Trailers to the Rescue

DETROIT, MICH., Dec. 16.—When the United States Railroad Administration issued an embargo on all freight, except perishables, coming into Detroit, it resulted in the almost immediate shutting down of several automobile plants which relied on the shipments of certain parts to carry on production. Among those affected was the Paige Company. However, this company saved the day for itself by ordering and using two Fruehauf trailers. With the use of these, attached to Paige trucks, all necessary parts are brought from Cleveland, O., and production continues as usual. These trucks and trailers are now running on regular schedule and have the added advantage of cutting time and freight schedules.



Quality Cars Built as the Country Made War

THROUGH industrial co-operation! This is the ideal that S K F had in mind two years ago when it established its research staff for the study of bearing applications.

With the market crying for cars in unprecedented quantities, the maintenance of both quality and deliveries is no slight task. And it is in this situation that the engineering assistance that S K F is able to render shows most markedly the value of co-operation.

The S K F research staff is equipped to take over the bearing problems of any manufacturer and with a product that knows no rival and a wealth of experience and investigation that is unequalled, solve them to both the manufacturer's and the public's satisfaction.

Manufacturers are invited to avail themselves of this bearing service at any time

S K F INDUSTRIES, INCORPORATED
Sales, Service and Research Division
165 Broadway, New York City

(572)

SKF INDUSTRIES

Hess-Bright Ball Bearings
S K F Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission Hangers

Price List, Capacities and Inflation Pressures of Large Size Pneumatic Tires

	36 x 6			38 x 7			40 x 8			42 x 9			44 x 10		
	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure
Amazon Rubber Co., Akron, O.															
Amazon Cord, non-skid	98.60	2000	106	.....	....	...	.....	....	...	.....	....	...	.....	....	...
American Rubber & Tire Co., Akron, O.															
Americord, non-skid	109.45	....	..	154.25	....	...	198.75	....	...	.....	....	...	.....	....	...
Bergougnan Rubber Corp., Trenton, N. J.															
Bergougnan Cord, non-skid	112.00	....	..	.....	....	...	189.75	....	...	.....	....	...	.....	....	...
Braender Rubber & Tire Co., Rutherford, N. J.															
Braender, Super Cord, non-skid	110.40	....	..	156.10	....	...	201.15	....	...	.....	....	...	.....	....	...
Brunswick-Balke-Collender Co., Chicago, Ill.															
Brunswick Cord, Skid-Not	98.50	....	..	139.25	....	...	179.50	....	...	.....	....	...	.....	....	...
Curtis Tire & Rubber Co., Muskegon, Mich.															
Curtis Cord, Road	93.05	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Empire Tire & Rubber Co., Trenton, N. J.															
Empire Cord, Gray, non-skid	99.45	....	..	140.65	....	...	181.20	....	...	.....	....	...	.....	....	...
Falls Rubber Co., Cuyahoga Falls, O.															
Falls Cord, Neverslip	112.00	....	..	157.00	....	...	.....	....	...	.....	....	...	.....	....	...
Federal Rubber Co. of Ill., Cudahy, Wis.															
*Federal Cord, non-skid	99.45	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Firestone Tire & Rubber Co., Akron, O.															
Firestone Cord, Triple	99.45	2250	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Firestone Cord, non-skid	99.45	2250	90	140.65	2880	100	181.20	3660	110	226.95	4700	120	317.20	5850	130
Fisk Rubber Co., Chicopee Falls, Mass.															
Fisk Cord, non-skid	99.45	1700	90	140.65	2200	100	181.20	3000	110	.....	....	...	.....	....	...
General Tire & Rubber Co., Akron, O.															
General Cord, non-skid	106.25	2200	..	150.25	3000	...	193.65	4000	...	242.60	5000	...	338.90	6000	...
Goodrich, B. F. Rubber Co., Akron, O.															
Goodrich Cord, Ribbed	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
Goodrich Cord, Safety	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
Goodyear Tire & Rubber Co., Akron, O.															
Goodyear Cord, Ribbed	99.45	2000	90	140.65	2700	100	181.20	3650	110	.....	....	...	.....	....	...
Goodyear Cord, All-Weather	99.45	2000	90	140.65	2700	100	181.20	3650	110	226.95	4650	120	317.20	5800	130
Gordon Tire & Rubber Co., Canton, O.															
Truck Cord, non-skid	126.00	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Hewitt Rubber Co., Buffalo, N. Y.															
Hewitt Cord, non-skid	109.45	1700	75	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Howe Rubber Co., Inc., New Brunswick, N. J.															
Howe Ultra Cord, non-skid	109.80	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
India Tire & Rubber Co., Akron, O.															
India Cord, non-skid	108.30	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
International India Rubber Corp., South Bend, Ind.															
Odell Cord, rough	68.00	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Kelly-Springfield Tire Co., Cleveland, O.															
Kelly-Springfield Cord, grooved	120.00	....	..	160.00	....	...	200.00	....	...	.....	....	...	.....	....	...
Kelly-Springfield Cord, BB	120.00	....	..	160.00	....	...	200.00	....	...	.....	....	...	.....	....	...
McGraw Tire & Rubber Co., Cleveland, O.															
McGraw Cord, ribbed	99.45	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
McGraw Cord, non-skid	99.45	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Marathon Tire & Rubber Co., Cuyahoga Falls, O.															
Marathon Cord, Angle	107.20	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Mason Tire & Rubber Co., Kent, O.															
Mason Cord, non-skid	98.50	1700	100	139.30	2450	110	179.50	3300	120	.....	....	...	.....	....	...
Miller Rubber Co., Akron, O.															
Miller Cord, Geared-to-the-Road	104.70	....	..	148.05	....	...	190.75	....	...	.....	....	...	.....	....	...
Mohawk Rubber Co., Akron, O.															
Mohawk Cord, non-skid	119.70	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Norwalk Tire & Rubber Co., Norwalk, Conn.															
Norwalk Cord, non-skid	117.00	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Oldfield Tire Co., Cleveland, O.															
Oldfield Cord, anti-skid	104.42	2250	90	147.68	2880	100	190.26	3660	110	.....	....	...	.....	....	...
Pennsylvania Rubber Co., Jeannette, Pa.															
Vacuum Cup Cord	108.40	2200	90	153.35	3000	100	197.60	4000	110	.....	....	...	.....	....	...
Portage Rubber Co., Barberton, O.															
Portage Cord, Daisy	120.00	....	..	160.00	....	...	200.00	....	...	.....	....	...	.....	....	...
Racine Rubber Co., Racine, Wis.															
Racine Multi Mile Cord, non-skid	98.20	2000	..	138.90	2700	...	178.95	4000	...	.....	....	...	.....	....	...
Republic Rubber Co., Youngstown, O.															
Republic Cord, staggard	109.95	....	..	155.50	....	...	.....	....	...	.....	....	...	.....	....	...
Star Rubber Co., Akron, O.															
Star Cord, "All Star"	120.00	....	..	.....	....	...	200.00	....	...	.....	....	...	.....	....	...
Sterling Tire Corp., Rutherford, N. J.															
Sterling Cord, non-skid	102.95	....	..	140.60	....	...	178.20	....	...	.....	....	...	.....	....	...
Sterling Spec. Cord, ribbed	102.95	....	..	140.60	....	...	178.20	....	...	.....	....	...	.....	....	...
Swinehart Tire & Rubber Co., Akron, O.															
Swinehart Cord, Hexagon	101.45	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
United States Tire Co., New York City															
U. S. Nobby Cord	99.45	2050	90	140.65	2750	100	181.20	3600	110	226.95	4650	120	317.20	5800	130
Washington Tire & Rubber Co., Spokane, Wash.															
Western States, Cord	109.45	....	..	154.75	....	...	199.45	....	...	.....	....	...	.....	....	...

*These prices include Government Excise Tax.

Motor Transport Corps Formed

NEW YORK CITY, Dec. 15.—The Motor Transport Club of the American Legion was organized at a largely attended meeting held at the Motor Transport Club on December 8. The following officers have been chosen to serve one year: Arthur J. Slade, president; John A. Broderick, vice-president; L. S. Plaut, second vice-president; Daniel Petrucelly, third vice-president; Daniel J. Shea, secretary, and Harvey J. Kutz, treasurer.

Prest-O-Lite Distributors Get Together

RICHMOND, VA., Dec. 15.—Southern representatives of the Prest-O-Lite Company recently met at Richmond, Va. Stereopticon views were shown of the Prest-O-Lite factory in operation and instruction given on manufacture of the products. The new advertising plans of the company were described at this time.

Review of Chicago Show next issue

Secretary of War has issued an order to the effect that in auction sales of government owned motor vehicles, all officials and employees of the War Department and all officers, enlisted men and civilian employees of the army will be excluded from the field of bidders.

Menominee Motor Truck Company, Menominee, Mich., announces that the meeting of the new stockholders. Anton Kuokuk, president; W. A. Holt, vice-following officers were elected at a recent president; James A. Bell, secretary, treasurer and general manager.

GARFORD



—*Low Cost Ton-Mile* is the basis upon which the efficiency of Garford performance is proven.

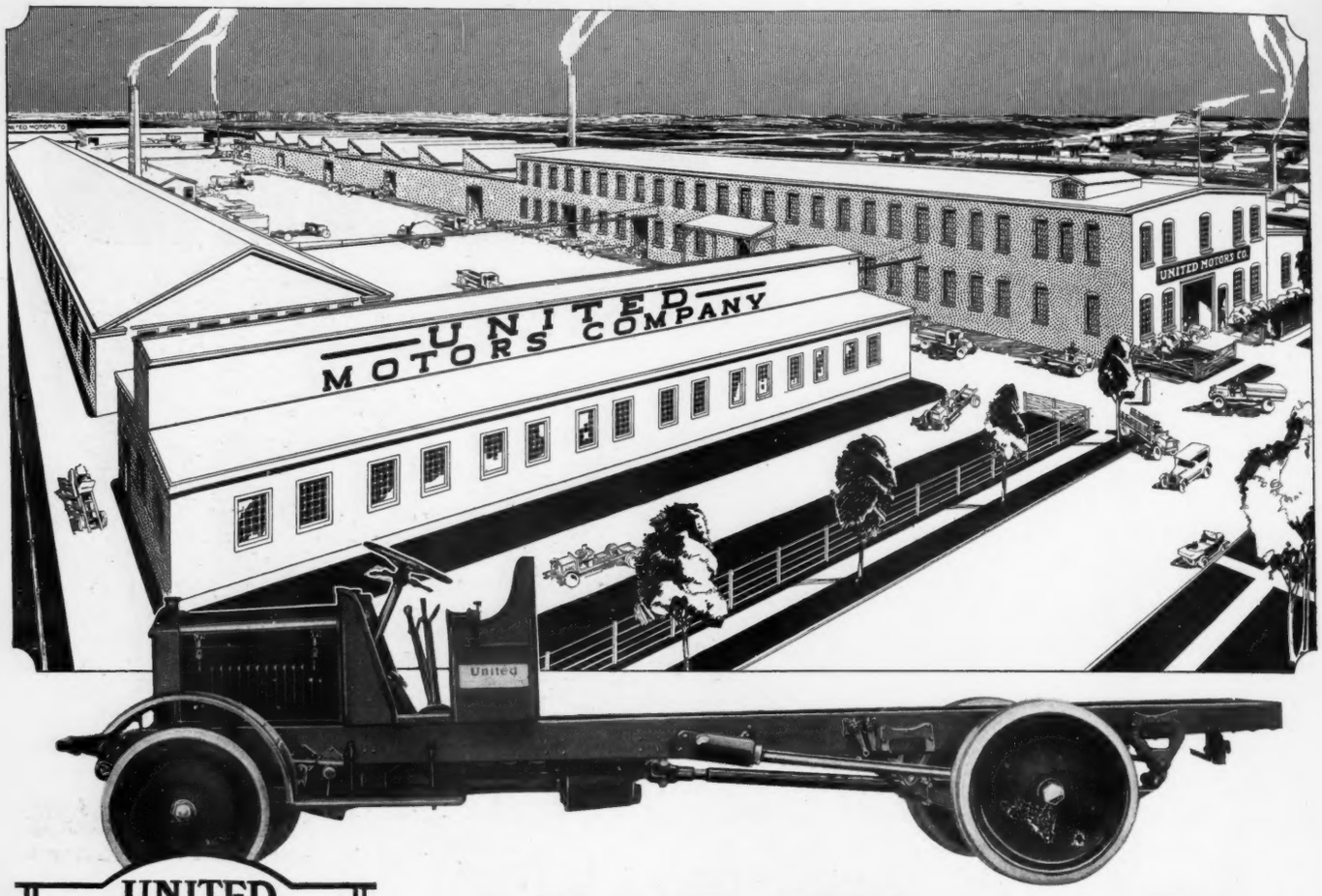
Garford

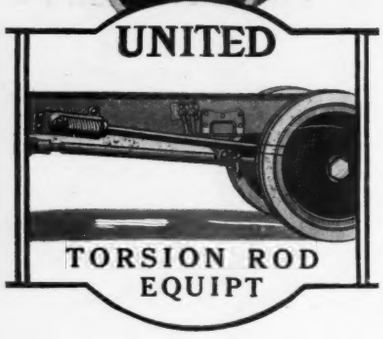
Lima, Ohio

That the United States Army has made Garford a Class A standard is another proof of Garford serviceability

Garford Exhibit at Chicago Show, Space A-7

TRUCKS





The torsion rod regulates the shock and weight on the springs and axle and is typical of the thought and care which has made this the wonder of truckdom.

The engine in this truck is the Buda. Stromberg carburetor, Brown-Lipe transmission, Clark internal-gear axle, Eisemann magneto, Simplex governor and Ross steering gear.

A Truck Without a Peer

Built by an old established, well financed company, able to make prompt, satisfactory deliveries

Few trucks compare with the United in power and performance. The quality of this truck is apparent and easily demonstrated. Its many exclusive features reflect careful, experienced construction.

You will find the unquestioned value of United Motor Trucks will swing the solid, substantial truck buyer. With a size for every type of haulage, 1½, 2½, 3½ and 5-ton models, the United dealer is able to easily meet today's requirements.

In all matters of service we are known as standing solidly behind the dealer and help him retain his customers' good-will by prompt and able assistance.

A Golden Opportunity for Live Dealers

The United still has an opening for a few responsible dealers who have the financial backing, the pep and the experience to properly represent this company. To this type of man, a selling franchise is available which will prove a most profitable connection.

UNITED MOTORS COMPANY
GRAND RAPIDS, MICH.

UNITED TRUCKS

The Truck Tire That Makes Lasting Friends



SUPERIOR Service can only mean Superior Quality that holds such firms as John S. Baisden, Inc.

Because of their exceptional wear-resisting quality it is inevitable that Polack Truck Tires should continue to give *year after year satisfaction.*

Years of specialization with one product—the pioneer of all Truck Tires—have established Quality in Polack Truck Tires on a certain scientific basis that assures Truck Users fine service as consistent as it is exceptional.

Dealers can take advantage of the attractive money-making opportunity in selling Polack Truck Tires to the best class of truck users.

The superior performance of Polack Truck Tires in all lines of business assures Dealers a constantly-growing volume and the lasting good-will of their customers.

With a product that is right, a price that is right, and an adjustment basis that is an established fact, not an innovation, the Polack Dealer proposition undoubtedly offers an attractive money-making opportunity.

POLACK TRUCK TIRES

SINCE 1899 WORLD'S STANDARD

—*complete in both Regular type and High Crown type.*
—enable Dealers to dominate the best and most profitable truck-user business in their territory not only the first year, but every year.

Write for full details of Polack Dealer Proposition in open territory

POLACK TYRE & RUBBER CO.

1876 BROADWAY, -- NEW YORK.

Activities of the Motor Truck Association of Philadelphia

OFFICERS

E. J. BERLET, President
J. P. CRANSTON, Vice President
W. R. WALTON, Treasurer
W. H. METCALF, Sec'y, 328 N. Broad Street

BOARD OF GOVERNORS

T. K. QUIRK, F. A. KISSEL, E. P. GAUL, W. Y. ANTHONY

THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

Discuss Pennsylvania Motor Laws

The Christmas dinner and last monthly meeting of the year of the Motor Truck Association of Philadelphia was held on Wednesday evening, December 17, Hotel Adelphia. The Christmas address was delivered by Rev. Floyd W. Tomkins, S.T.D., rector of Holy Trinity P. E. Church, who complimented the association on putting into practice in business the same spirit of co-operation and brotherliness that he said was one of the greatest outcomes between all classes of men and nations as the result of the World War.

The business address of the evening was by Benjamin G. Eynon, State Registrar of Motor Vehicles, at Harrisburg, who explained the details of the new motor laws, as regards fees, registration and operation of motor trucks. From the many restrictions and regulations provided, he made the motor truck men feel they were almost criminals to be in business at all and it was evident they would have to tread a straight and narrow path to escape the law's meshes. From questions fired at him by members, it was revealed the law was inconsistent and imperfect in several respects and would probably later have to be amended. The registrar warned them his department would shortly put out inspectors on the outskirts of cities to test trucks for overloading and advised owners especially to keep within the new law, which permits no overload beyond the manufacturer's certification of load capacity. His written address will be reprinted for distribution to the members.

The officers elected for the coming year are as follows: President, E. J. Berlet, Stability Motors Co.; vice-president, J. P. Cranston, Vim Motor Truck Co.; treasurer, W. R. Walton, Firestone Tire & Rubber Co.; secretary, W. H. Metcalf, Wire Wheel Corp. of America. Directors: Thos. K. Quirk, H. Kaiser & Co.; F. A. Kissell, Kelly-Springfield Tire Co.; E. P. Gaul, Gaul, Derr & Shearer Co.; Walter Y. Anthony, Packard Motor Car Co.

Walter Y. Anthony presented a most satisfactory report on the proposed new department for one of the City High Schools for the training of automotive mechanics and secured pledges from a dozen firms to supply automobile parts for the same. He said Professor Ash, of the City School System, was about ready to inaugurate the course, with the Board of Education's approval, in either the Frankford or the Central High School.

Traffic Convention Brings in Twenty-two Million Dollars Worth of Business

SELLING a million dollars' worth of motor trucks a minute for twenty-two consecutive minutes—that was the astounding feat accomplished by Vice-President T. C. Brandle and Sales Manager Harry H. H. Hawke, of the Traffic Motor Truck Corp., on the first evening of the annual convention of distributors and dealers at St. Louis, Dec. 11. That the sales were bona fide was attested on the next day, when those who had placed their orders verbally the evening before as fast as they could be written down took out their fountain pens and signed binding dealer contracts calling for delivery of Traffic trucks during 1920 totalling even bigger figures than the record sale of the night session.

This was the high spot of the 1919 convention of Traffic men from all over the United States. Nearly 500 dealers and distributors attended the convention, the main sessions of which were held in the Traffic company's new paint shop. A huge fire place, sending out warmth and cheer, and Christmas decorations made the paint shop an inviting place for the meetings and around the edges of the room booths, properly labeled, were used by the various district distributors for conducting business with the dealers under their direction.

The first day of the convention was given to a general get together session at the Traffic factories. The hundreds of dealers and distributors inspected the plant from top to bottom, saw how a Traffic truck was turned out completed every twenty minutes, and gave a lot of attention to the demolishing of the many old houses on the tract of land just north of the present plant, where the Traffic company will erect a fine new factory to care for the increased Traffic truck demands in the future.



T. C. Brandle, Vice President Traffic Motor Truck Corporation

He managed the sale of $20,000,000 worth of trucks in twenty-two minutes

A banquet at the Jefferson Hotel the first evening furnished the setting for the phenomenal sale told of above. President Guy Wilson addressed the assembled dealers and W. C. D'Arcy, president of the advertising company that bears his name, was also one of the principal speakers. Messrs. Brandle and Hawke also made short addresses preliminary to conducting the big sale.

The meeting closed Friday evening with another banquet and "frolic" at the Jefferson Hotel, during which a program of entertainment was staged under the personal direction of Vice-President Brandle that kept the guests very well entertained till long after the midnight hour.

The Traffic Motor Truck Corp. has shown a steady growth since its organization and with the completion of the new addition to its plant now in course of construction, it will be better fitted than ever to turn out the 4000 lb. capacity truck on which it is standardizing. In line with its policy of having contended workmen in its employ, the company announced at Christmas time that a minimum wage of $5 per day would be put into effect at once.



Sewell Wheel Equipped Truck Used for Glass Haulage

Unique bodied truck operated by the Pittsburgh Plate Glass Company for transporting its plate glass. One class of business that characterizes the increasing demand for Sewell Cushion Wheels is that of the business houses who transport by truck fragile loads, such as plate glass, furniture, and products of bottling concerns. Success in the transportation of this kind of product is attributed to the resiliency of the cushion wheels which not only protect the load but the truck as well.

A Kelly Truck and a Three-Ton Troy Trailer Hauling Twenty-one Car Bodies

This outfit is owned and operated by the J. S. Wagner Transfer and Storage Company, Springfield, Indiana. This company, in lieu of proper railway facilities, has taken over the Westcott Motor Company's freight. This truck-trailer travels a hundred miles to Muncie, Indiana, making a round-trip in twenty hours, including loading and unloading time.





Electric Trucks Big Labor Saver in Tire Plant

The first electric truck ever operated at the Goodyear plant, and its driver. This truck, which has been in operation for six years in one of the departments, has traveled approximately 180,000 miles. The truck hauls a load of 3,100 pounds each trip, making a trip every four minutes about the department. In one eight-hour shift it pulls over 200,000 pounds of tires and cores, doing the work that it formerly took tw.nty-five men to do.

Pure Oil Company Adopts Motor Trucks Equipped With Sewell Cushion Wheels

The Pure Oil Company, realizing the indispensable utility of the motor-truck in marketing its products, has recently purchased a fleet of five Sterling, Sewell Wheel equipped, trucks to replace the horse-drawn delivery system in Pittsburgh and adjacent territory.



Motor Truck Dealers in Round Tables Discussion

FOR the first time since its organization the Ohio Automobile Trade Association tried out the round table method of conducting craft meetings at its recent convention at Cleveland. By using this method much time and confusion was saved, for the passenger car men discussed their problems in their special meeting, while truck men, battery men, service station men and others were discussing their problems in separate sessions, each taking up the questions of most interest to the craft represented.

Y. B. Jones, manager of the Lawrence Bros. Republic agency at Columbus, O., and president of the Columbus Auto Trade Association, acted as chairman. Mr. Jones' long experience in the motor truck business made his choice an exceptionally good one and the sessions were very interesting and instructive.

Discount to Garage Impossible

One of the most interesting matters brought up in the discussions was the attitude of the truck dealer toward the independent garage and repair shop. The repair shop man feels that he ought to be given a trade discount when he buys a part to be used in repairing a truck sold by the local agent, but the consensus of opinion among the truck dealers was that the repair man is not entitled to a discount, because the truck dealer would lose money if he sold parts at a discount.

Mr. Jones stated that, in his opinion, the average parts department maintained by the truck dealer broke about even on profit and loss, that where the proper charges were made against the department for space occupied, cost of help required, mail, telegraphic and express charges, and all the other minor expenses that enter into the upkeep of a proper parts department, that the discount allowed the dealer by the manufacturer barely covered the cost of the department, and that the parts must be sold at list price to clear the agent on the transaction. Motor truck dealers find it hard to convince repair shop owners that they cannot afford to sell parts at a discount, but those present agreed that the truck dealer should stick to list prices.

Trade-in Still a Stumbling Block

Another very interesting subject taken up related to taking in used trucks in making new sales. Dealers present agreed that about 90 per cent. of the trucks offered in trade were about ready for the junk heap, and should not be considered other than for their junk value. It was conceded that occasionally a truck is offered in trade because the owner wishes to get a larger truck, finding that his work has outgrown the original purchase, and in such cases the used truck is usually worth considering.

All agreed that the traded in truck should be practically rebuilt before being offered for sale, as no dealer can afford to sell even a used truck that is not in good condition.

The attitude of the motor truck purchaser who comes back with a broken part, which, under the guarantee, must be replaced, was taken up. It was agreed that the dealer is justified in charging for applying the new part, but that the dealer should advise the owner before hand that a charge will be made for labor.

The attitude of the present day motor truck prospect toward the product he purchases was well outlined at the meeting, that he considers the character of the factory and dealer of as much importance as the mechanical excellence of the truck.

The dealers agreed that it was good business policy to refuse to sell a truck to a prospect who could not clearly show his ability to pay for the machine in a reasonable length of time. One successful dealer stated that he always insisted on an original deposit of sufficient size so that if the truck did come back on his hands, he could not lose by the transaction. This was endorsed as a good plan by those present.

Combination Line Satisfactory

The question of the manufacturer who builds both passenger cars and light trucks, and forces a large number of trucks on his dealers with each order for passenger cars, was taken up and led to strenuous discussion. One dealer, who handles this type of combination line, stated that he found no trouble in showing his factory just exactly how many trucks he could handle, and did not find himself forced at any time to take more than he could conveniently dispose of at list prices. He also stated that when he found his trucks piling up on his hands, he straightway started an intensive selling campaign and always found that this produced results, and that the trucks could be sold, by good salesmanship, at list prices.

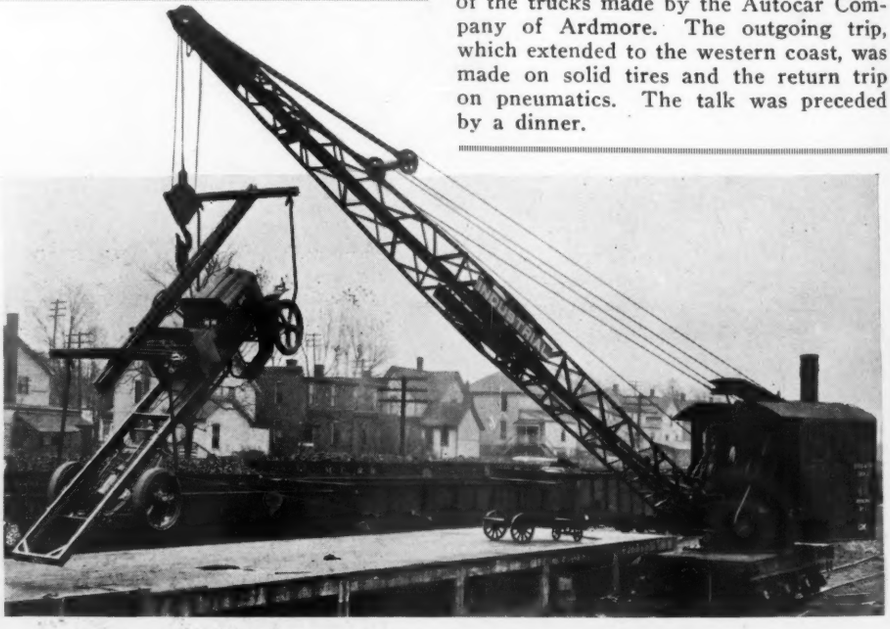
That this was not always the case was attested by many dealers present, who felt that the big manufacturers of passenger cars and trucks should find some way to dispose of their trucks other than through their passenger car dealers at cut prices, a method that invariably upset things in the local truck markets.

Many New Ideas Presented

Other interesting questions were taken up at the round table, which was well attended each day. Truck dealers who attended took home with them many excellent ideas which will be of help to them in their business during the year.

Tells of Trial Trip

PHILADELPHIA, PA., Dec. 18.—A. K. Brumbaugh, chairman, gave an illustrated lecture before the members of the Pennsylvania Section of the S. A. E. at its monthly meeting on December 17. He described in detail the test trip of one of the trucks made by the Autocar Company of Ardmore. The outgoing trip, which extended to the western coast, was made on solid tires and the return trip on pneumatics. The talk was preceded by a dinner.



Monster Crane in the Service of the GMC Traffic Department

No trouble is experienced in loading trucks on flat bottom freight cars, as they may be run up on skids under their own power, but when coal cars and other gondolas are on the siding a different proposition is confronted. This problem has been satisfactorily met by the GMC company by the installation of a huge crane which picks up the chassis and swings it around, depositing it over and into the cars of the coal car type. After the truck has been anchored securely, so that the shunting of the gondola will not affect them, all is ready for a trip to the destination.

The Motor and Accessory Manufacturers' Association Meeting

By A. V. COMINGS

PRACTICALLY the same officers will be in command in the Motor and Accessory Manufacturers' Association during 1920 as a result of the elections held during the New York show. C. E. Thompson, president of the Steel Products Co., Cleveland, was re-elected president of the association, and Messrs. E. H. Broadwell, vice-president of the Fisk Rubber Co., Chicopee Falls, Mass.; Christian Girl, president of the Standard Parts Co., Cleveland, and W. O. Rutherford, vice-president of the B. F. Goodrich Rubber Co., Akron, O., were re-elected first, second and third vice-presidents, respectively. L. M. Wainwright, president of the Diamond Chain Co., Indianapolis, was re-elected treasurer.

The only change in the list of officers was made in the secretary and assistant treasurer, C. Brewer Griffin, manager of the automobile equipment department of the Westinghouse Electric & Mfg. Co., of New York, being elected to fill the place of Thomas J. Wetzel, a retiring member of the board.

In addition to Messrs. Rutherford and Griffin, mentioned above, the new directors consist of E. E. Allyne, president of the Aluminum Castings Co., Cleveland, and J. M. McComb, assistant treasurer of the Crucible Steel Co. The retiring directors were C. W. Stiger, J. H. Foster and T. J. Wetzel.

The new board of directors and committees for the ensuing year are as follows:

Board of Directors.

C. F. Thompson, Steel Products Company, Cleveland, Ohio.
E. H. Broadwell, The Fisk Rubber Co., Chicopee Falls, Mass.
Christian Girl, Standard Parts Company, Cleveland, Ohio.
W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.
L. M. Wainwright, Diamond Chain & Mfg. Co., Indianapolis, Ind.
G. Brewer Griffin, Westinghouse Electric & Mfg. Co., New York, N. Y.
E. E. Allyne, Aluminum Manufacturers, Inc., Cleveland, Ohio.
E. W. Beach, Ferro Machine & Foundry Co., Cleveland, Ohio.
G. W. Yeoman, Continental Motors Corporation, Detroit, Mich.
E. P. Hammond, Gemmer Manufacturing Co., Detroit, Mich.
J. M. McComb, Crucible Steel Co. of America, Pittsburgh, Pa.
A. W. Copland, Detroit Gear & Machine Co., Detroit, Mich.

Executive Committee.

C. E. Thompson, Chairman, Steel Products Co., Cleveland, Ohio.
E. H. Broadwell, The Fisk Rubber Co., Chicopee Falls, Mass.
Christian Girl, Standard Parts Co., Cleveland, Ohio.
W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.
E. P. Hammond, Gemmer Manufacturing Co., Detroit, Mich.
G. Brewer Griffin, Westinghouse Electric & Mfg. Co., New York, N. Y.
A. W. Copland, Detroit Gear & Machine Co., Detroit, Mich.

Finance Committee.

E. H. Broadwell, The Fisk Rubber Co., Chicopee Falls, Mass.
C. E. Thompson, Steel Products Co., Cleveland, Ohio.
Christian Girl, Standard Parts Co., Cleveland, Ohio.
W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.
G. W. Yeoman, Continental Motors Corporation, Detroit, Mich.
J. M. McComb, Crucible Steel Co. of America, Pittsburgh, Pa.
A. W. Copland, Detroit Gear & Machine Co., Detroit, Mich.

Show and Allotment Committee.

Christian Girl, Chairman, Standard Parts Co., Cleveland, Ohio.
G. W. Yeoman, Continental Motors Corporation, Detroit, Mich.
W. O. Rutherford, The B. F. Goodrich Co., Akron, Ohio.
G. Brewer Griffin, Westinghouse Electric & Mfg. Co., New York, N. Y.
E. E. Allyne, Aluminum Manufacturers, Inc., Cleveland, Ohio.

Auditing Committee.

President: C. E. Thompson, Steel Products Co., Cleveland, Ohio.
Secretary: G. Brewer Griffin, Westinghouse Electric & Mfg. Co., New York, N. Y.
Treasurer: L. M. Wainwright, Diamond Chain & Mfg. Co., Indianapolis, Ind.

Membership Committee.

W. O. Rutherford, Chairman, The B. F. Goodrich Co., Akron, Ohio.
E. W. Beach, Ferro Machine & Foundry Co., Cleveland, Ohio.
L. M. Wainwright, Diamond Chain & Mfg. Co., Indianapolis, Ind.

Banquet Committee.

W. O. Rutherford, Chairman, The B. F. Goodrich Co., Akron, Ohio.
Christian Girl, Standard Parts Co., Cleveland, Ohio.
G. W. Yeoman, Continental Motors Corporation, Detroit, Mich.
E. P. Hammond, Gemmer Manufacturing Co., Detroit, Mich.
J. M. McComb, Crucible Steel Co. of America, Pittsburgh, Pa.

The members of the association and their friends held their annual banquet and frolic at the Commodore Hotel Wednesday evening of show week and it was by far the most entertaining of their many similar events. The banquet was exceptionally enjoyable, and the vaudeville bill put on afterward was made up only of head liners from the various top-notch houses in New York. The diners enjoyed the frivolity till away into the night.

Manager M. L. Heminway and his aides are entitled to great credit for the able manner in which the M. A. M. events were handled during show week.

J. H. Collins, of Bureau of Markets, Washington. Heads Chilton Company's Survey Department

The latest acquisition to the staff of Chilton Company, publisher of this and other trade magazines, is Mr. J. H. Collins, recently investigator of the Bureau of Markets, Washington, D. C. As head of the new department of Commercial Survey, he will have an opportunity to exercise the ability which he has demonstrated for the Government during the past few years.

Mr. Collins, who is a graduate of the College of Agriculture, University of Arkansas, was from 1913 to 1914 Field Investigator of the Arkansas Agricultural Experiment Station. From 1914 to 1916 he was scientific assistant in the U. S. Department of Agriculture. In addition to his activities from 1916 to 1919, as investigator in market surveys, Bureau of Markets, he was also in charge of the Motor Transports Section of U. S. Department of Agriculture. In this connection he organized and established several of the first rural motor express routes, making a detail study of methods and costs of commercial car operations. In this work he directed the Government group of investigators who studied motor hauling in the different sections of the United States.



J. H. Collins
Formerly investigator of the Bureau of Markets, Washington, D. C.

During the war, in addition to many other duties, he directed the purchase and sale to farmers of nitrate of soda, under authority of Section 27, of the Food Control Act. This involved the organization of a national sales organization, numbering nearly 500, the purchase both in this country and in Chile of a vast quantity of nitrate of soda, the organization of shipping departments to handle shipments from storage points, and the sale at cost to 100,000 farmers of over $18,000,000 worth of nitrate.

During 1919, member of the Highways Transport Committee, Council of National Defense. Author of the section on marketing, Doubleday, Page and Company's Cyclopedia of American Agriculture, numerous bulletins, articles and special reports on marketing and motor transportation.

Service Associations Hold First Annual Convention

NEW YORK, Jan. 5.—The first annual convention of the Automotive Service Associations, comprising members of the Newark and New York associations, was held this afternoon at the Automobile Club of America. The event was well attended and the papers read proved interesting, as these dealt with the various problems with which the service manager is confronted. The convention was opened by an address by Alfred Reeves, general manager of the N. A. C. C., who in well chosen words pointed out the need of service associations and their value to the commercial car industry.

Reviews Progress of Associations

J. Howard Pile, secretary of the New York Association, read a paper on the "Benefits of a Service Association," in which he described the activities of the association since its inception. It had, he said, resulted in bringing the service heads of the various companies in each city in closer relation to one another and how this resulted in the dissemination of information of local value. One of the values of the association in New York, he said, was the co-operation between the members when the body makers went on a strike. The advantages of the employment bureau were also discussed. By it members were able to obtain skilled workmen as well as to obtain a line on the stability of the applicants for position, as well as to eliminate the radical type of mechanic who is a trouble breeder in a service station.

Reference was made to the movement on foot to organize the mechanics and workers in the service station by outsiders, and the undesirability of such an organization was pointed out. Members were warned that sooner or later they would be confronted by such a problem and that unionism was undesirable.

In his paper, "Why Cooperation of the Automotive Industry and the Motor Transport Corps is a Vital Necessity," Major R. A. Osmun described the activities of the corps abroad and the role played by the automotive industry. He made an earnest plea for the co-operation of the automotive industry to perpetuate the Motor Transport Corps which, he said, is likely to pass out of existence unless steps be taken to retain its identity.

Al Rawson, president of the Automotive Service Association of Newark, read a paper on "Selling Service," in which he explained the successful policy of the Reo Motor Car Company, with which the speaker is connected. Mr. Rawson explained in detail how the customer was sold the Reo service from the time of purchase of a truck until the car outlived its usefulness.

Value of Technical Knowledge

"The Benefits of Technical Knowledge to the Practical Man" was the subject of Prof. Ethelbert Favary's paper, in which he explained how a technical training assisted the service manager, and he gave many concrete analogies. In this connection it is interesting to note that Prof. Favary is to conduct a special course for the members of the Newark and New York associations. These lectures are to be held weekly in New York on Tuesday evenings. A large number of the members signified their intention of joining the class.

In his paper, "Classification and Development of Service and Service Craftsman," president Rognon, who presided at the convention, said service had four principal angles. "The dealer's angle," he said, "was that the service station acts as an adjusting department, both mentally and mechanically, in assuming the obligations created by the guarantee of the product that he sells. And an efficient service organization means to the dealer the maintenance of the reputation of the product that he deals in, and is one of his biggest advertising assets. The owner expects that he can buy from the service station highly skilled labor and parts, and that not only will the work be more efficiently performed, but the cost will be less than under normal conditions." Mr. Rognon pointed out the need of commercializing service and that only by such a step can the service associations be successful and co-operate with the dealer and the manufacturer. He pointed out that the problem was a gigantic one in that there were over 6,000,000 automobiles in operation, and that to serve these required bringing service to the same level as with other commercial products. Walter L. Hervey, member of the Board of Examiners, New York public schools, addressed the convention on education.

N. A. D. A. to Co-operate

Harry Moock, of the N. A. D. A., in his talk on service, explained, with the aid of charts, how the N. A. D. A. proposed to organize service branches in the various cities, towns, counties and states throughout the country. This national organization of service was essential, he said, and could best be accomplished through co-ordination of the efforts of the N. A. D. A., the dealers and their service heads. The plan includes bureaus for gathering and compiling service data, as well as to conduct research work and to supply members and the service organizations with all information. Much discussion followed the address and many interesting points were brought out.

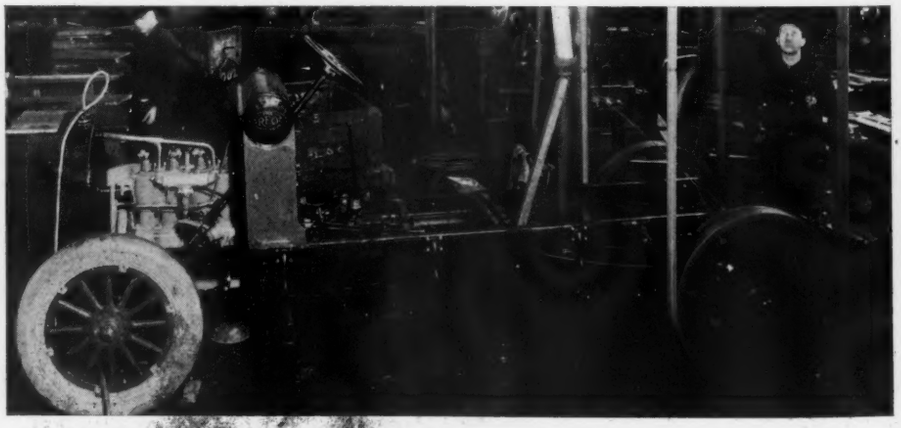
Following the convention was a dinner, but there were no addresses. Music and entertainment was supplied by a committee headed by a veteran service manager.

One of the features of the convention was the exhibit of time and labor saving devices, some of which were original and contributed by the mechanical departments of the members of the associations.

Has Exclusive Sales Right

NEW YORK CITY, Dec. 18.—The Automotive Products Corporation has acquired exclusive sales right for all foreign territories of the Standard Roller Bearing Company of Philadelphia, covering their roller and ball bearings. They have also completed arrangements to export the products of the New Jersey Car Spring and Rubber Company of Jersey City, makers of automobile tires and inner tubes.

Aluminum Casting Company, Cleveland, O., has been reorganized and will be known, in the future, as the Aluminum Manufactures, Inc. In addition to taking over the plants of the Aluminum Castings Company, the new company is planning to construct an aluminum forging plant and other plants for making finished aluminum products.



The Reo Speed Wagon a Temporary Makeshift in Factory Plant

The Reo Speed Wagon which has an S. A. E. rating of 27.23 hp. was used by the Reo Motor Truck Company, Lansing, Michigan, in the sheet metal department of its factory to replace two 20 hp. electric motors which were shut down because of the coal famine that had existed in the state of Michigan a short time ago.

Fuel Problems and Tendencies in Engine Design

(*Continued from Page 47*)

The standards committee, ball and roller bearings divisions, reported on the extra wide, light, medium, etc., series, and the lighting division on headlight illumination. The tire and rim division reported on rim sections and contours for pneumatic tires, as did the division for trailer hitches.

One of the two morning papers was "Tendencies in Engine Design," by L. H. Pomeroy, and illustrated by slides. He paid tribute to the automotive industry in his opening remarks by stating:

"I have had the honor and pleasure of being conducted over many American factories during my stay in the United States and have seen with great pleasure the vindication of principles I have held for many years in relation to cost of production. By sheer manufacturing skill and enterprise, work of the first quality is produced, complex parts seem to have no terror for the production department and any rational increase in the complexity of design does not appear to be a consideration in arriving at a desired result. The engineer is far less limited here than in Europe in attaining his ends, and for this reason the goal of complete mechanical reliability is well within sight when an automobile will be as reliable as a watch."

The paper dealt with the trend of design in the light of recent developments of the following:

1. The effect toward obtaining absolute mechanical reliability. 2. The application of modern views of gasoline thermodynamics. 3. Improvements in mechanical energy. 4. Improvements in engine balancing. 5. Improvements in carburetion and the capacity to deal with low grade fuels. 6. The principles of light engine design. 7. Cleanness of design.

The paper discussed, among other things, the relative advantages of the overhead valve engine and the side by side type.

Owing to the limited time, there was but little discussion of Mr. Pomeroy's paper. One member, however, touched upon the intake manifold design in a brief manner.

The paper by Frank H. Trego, "Needs of Engine Design," was not read or discussed. It dealt with support of the crankshaft bearings and the utilization of heat to overcome condensation. The paper dealt principally with the difficulty experienced in supplying a proper mixture and it was pointed out that the greatest problem was that of avoiding the possibility of condensation at low speeds with full throttle or at moderate speeds and part throttle.

Tests conducted showed that taking hot air into the carburetor is not good practice and a test on an electric dynamometer showed that greater power, hp., was developed without hot air. In summing up it was pointed out that the necessary features of a satisfactory engine with the



The National Automobile Chamber of Commerce Dinner Was One of the Big Functions of the Week

We haven't the official count but the above photo shows that the Annual N. A. C. C. dinner was some affair. Charles Clifton was toastmaster and George Graham was the speaker of the evening. Following one of the best speeches Graham ever made, a comedy skit kept the audience in laughter for a few hours

present day fuel are: Closing the intake valve early, small size of intake passages and the application of heat to the mixture after it leaves the carburetor. There was no discussion of Mr. Trego's paper.

A number of papers were read and discussed on Thursday. At the morning session J. G. Vincent read a paper on "Adapting Engines to Use of Available Fuels," and Thomas Midgeley, Jr., read a paper on "High Speed Indicators." The indicators described were shown in operation and so arranged as to project on a screen the card of an engine running under different conditions. G. A. Kramer read a paper on the "Dilution of Engine Lubricants."

A symposium on "Combustion of Hydrocarbon Fuels," included the following: "The Velocity of Flame Propagation," by Honaman and McKenzie; "Preignition and Spark Plugs," S. W. Sparrow. Informal talks were scheduled by C. F. Kettering, H. L. Hornung and H. C. Dickinson, dealing with the various phases of research work on combustion. Other papers scheduled were: "Composite Fuels," Dr. Joseph E. Pogue; "Bettering the Efficiency of Existing Engines," H. C. Gibson; "Mixture Requirements of Automobile Engines," Prof. O. C. Berry; "Supercharging Engines and Superchargers," Major G. E. A. Hallett; "Thermodynamics of Carburetion," C. F. Hopewell.

Various Social Activities

The social features of the Society of Automotive Engineers comprised a carnival night on Wednesday and the annual dinner on Thursday evening. The carnival referred to was a frolicsome affair, with plenty of action. It was spectacular and decidedly different from previous entertainments given by the society. A midway, fortune tellers, games of chance, and best of all, a bank where your demand for money to reimburse the operators of the games was not refused, were among the attractions. Everybody frolicked and danced until the wee sma' hours of the morning. The event was well attended and was without doubt one of the best of its kind arranged by the society. Much of the success was due to the carnival committee consisting of Norman Bell, chairman; H. G. McComb, A. C. Bergman, H. W. Slauson, H. L. Spohn and James Diamond.

The annual dinner on Thursday night broke all records for attendance. It was preceded by a reception. John K. Bangs was toastmaster and among the speakers were president Charles M. Manley, C. F. Kettering, J. G. Vincent, Charles E. Mitchell and Major Arthur Bles, late British administrator of Cologne under occupation.

B. F. Goodrich Rubber Co., Philadelphia, Pa., announces that it has been obliged to withdraw all outstanding quotations on mechanical rubber goods after January 1st. In a short time complete schedule of revised prices will be available. In the interim prices will be quoted on application.

Plain Facts Concerning the Derogatory Effects of Overloading a Truck

Most disastrous of all abuses of motor trucks is overloading. Every vital part of the truck is affected by continuous over-taxation of its rated strength, and results in a premature breakdown. These points are emphatically presented to the operators of motor trucks by the B. F. Goodrich Rubber Co., in an endeavor to effect greater economy in truck transportation.

By avoiding the more common abuses to which motor trucks are subjected, hundreds of truck owners will realize a greater period of service than they now get through neglect and carelessness.

Every truck built has a "factor of safety," or a margin of strength above its rated capacity. It was intended for emergency use, for strains are certain to occur in the life of any truck. Instead of abiding by the rated capacity, operators take advantage of this margin and persist in putting on a little more, regardless of the injurious results of this practice.

The parts of a motor truck affected by overloading are: The axle, the tires, the wheels, the springs, the frame, the brakes, the transmission and the engine. Not only will repair bills pile up, but the truck itself will be prematurely consigned to the dump-heap.

The axle may be gradually fractured and finally break with the truck owner attributing it to defective material. Bending strains is another phase of the effect of overloading on axles. When trucks are overloaded and the brakes are set firmly, greater friction against the road results and the torsion on the axle is approximately twice normal. Another strain is that which occurs when a truck swerves from its straight path, resulting in a strain caused by the heavy load's resistance against skidding. This bending stress must be resisted by the axle stock itself.

The wheels, too, are subjected to a bending strain. A wheel is designed to resist vertical strains, and not big pressures laterally.

The springs suffer a gradual deterioration from overloading. If any one claims a certain truck is guaranteed to carry half again as much as its rated capacity, it is safe to assume that the truck's springs are too stiff for rated capacity and, therefore, throw abnormal shocks on the mechanism of the truck.

Frames are frequently called on to withstand the shock of a drop over a beam or from a curb of some five or six inches. Over-loads multiply the impact far beyond the normal stress. Frames designed to resist such strains would be entirely too heavy and impracticable.

Of all possible abuses to solid motor truck tires overloading is the most disastrous. Owners should make sure that their trucks are equipped with tires sufficiently large to take care of the greatest loads their trucks will be subjected to. Loads should be so dispositioned that the rear tires will not be carrying an over-load, although the total load may be well within the truck's capacity.

Overloaded trucks quickly destroy or injure brakes, as it is necessary to apply them with grinding pressure in order to stop the truck within the customary distance.

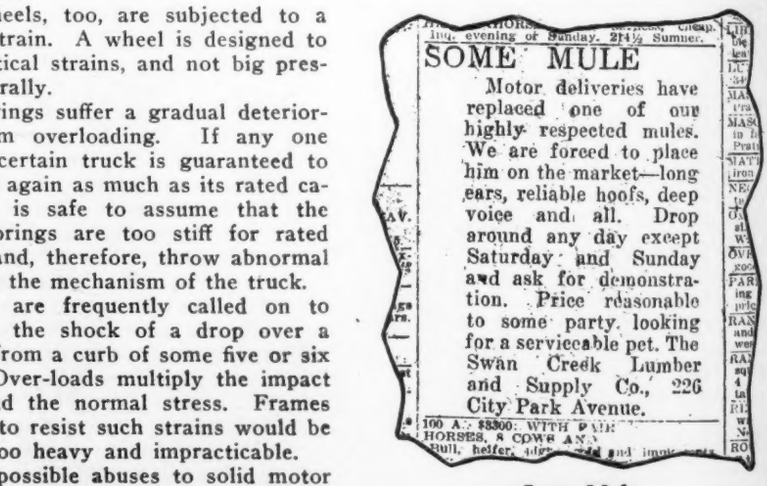
Overloading causes overwork of the transmission gears and shafts. The engine is affected in a like manner. There is additional strain on the crankshaft and the connecting rods, the gas explosions are more violent and the engine is frequently run at a greater speed than would be otherwise required.

Truck owners will stop a serious leak in their profits by avoiding overloading. It is the simplest and at the same time the most important abuse to remedy. It is not a technical problem and is not complicated. The only solution is "the ounce of prevention."

Hinkley Motors Corporation, Detroit, Mich., is operating at full speed despite electrical power regulations. Its entire power and light supply is obtained from a battery of Hinkley Heavy Duty Automotive Engines, which requires the attention of only one man.

Rawson-Upshaw Co., Atlanta, Ga., has opened for business on Marietta St., Atlanta, Ga. It has been organized to carry on an exclusively wholesale automotive equipment business. Its territory includes, for the present, Alabama, Georgia, Florida, South Carolina, Western North Carolina and Eastern Tennessee.

Akron-Williams Co., Akron, O., manufacturers of tire repairing and vulcanizing machinery, announce that the following officers were elected at the annual meeting of the stockholders. F. E. Holcomb, president; S. F. Ziliox, vice-president; G. Carl Dietz, treasurer; Charles Reymann, Charles Herberich and A. E. Burnett, additional directors.



Some Mule

The above advertisement appeared in a Bay City, Michigan, daily newspaper. Investigation disclosed the fact that the Union Motor Truck Company, of Bay City, Michigan, was the party responsible for this ad. We'll say that the Swan Creek Lumber Company will never miss the old mule, even with all its apparently good qualities.

Newark Service Men Meet

An instructive talk on lighting and starting service by H. W. Barber, Eastern service manager of the Electric Auto-Lite Corp., was the feature of the December meeting of the Automotive Service Association of Newark, N. J. A number of new members were elected. The next meeting is scheduled for January 13, when a talk on the fundamental principles and operation of the Philadelphia Diamond Grid Storage Battery of Philadelphia, will be given by Walter E. Holland, research engineer of this company.

U. S. Air Compressor Builds New Factory

CLEVELAND, O., Jan. 13.—The new factory being constructed by the United States Air Compressor Co. will be three times the size of its old factory. It will consist of a modern single story factory building with a two-story office building in front. There will also be two large storage buildings and a power house. The buildings are fireproof throughout and contain large steel framed windows which allow plenty of light to enter. New machinery will be installed and the entire operation, when complete, will be as modern as it is possible to build.

Motor Section for Department Stores

SALEM, MASS., Jan. 15.—What is thought to be one of the first automobile departments to be inaugurated in any department store is now completely established in the store belonging to Almy, Bigelow & Washburn, which has been established for over half a century.

The store has ever maintained that customers must be kept satisfied and as a result it now has a well organized motor service section in charge of Albert S. McIntyre, who conceived of the idea about four years ago while he was head of the delivery department.

The new department is housed in a new fireproof garage and service station which is modern in every detail and contains everything necessary to make a well equipped garage and up-to-the-minute service station. It has the agency for the Reo car. The new venture tends to become one of the most successful departments in the store, since last year's business amounted to over $250,000, and, if the prophesy of a member of the firm comes true, this year's will amount to $500,000.

Correction

In the list of motor truck and parts exhibitors at the New York Show, published on page 17 of the December issue of the COMMERCIAL CAR JOURNAL, the Four Wheel Drive Motor Truck Co. of Webberville, Mich., was listed. This should have been the Four Wheel Drive Auto Co., of Clintonville, Wis.

Hi There!

A Transporation Dialogue in One Act

Time: Any time.

Place: Any street corner.

Characters: Any two people trying to get anywhere.

"That's the third trolley that has sailed past us."

"We don't seem to have the combination. What do you suppose is wrong?"

"Damfino. Is this a near side or far side corner?"

"Might be either or both. Guess it depends on the traffic. Here comes a car."

"Here's our chance—that wagon on the track will hold him. Let's run!"

"Hi there! Open that door."

"Nothing doing—the conductor is motioning us to go to the other corner."

"Too bad he's so shut in that he can't hear you swearing at him."

"Come on, we will have to wade through this mud over to the other corner."

"Why in thunder are street railways allowed to lay their track in the middle of the road, anyway?"

"It stands to reason they hadn't ought to, but I guess they have to be laid somewhere. That's only one of their disadvantages."

"Now to try this corner."

"I have it! You stand on the track and persuade the motorman to stop while I vamp the conductor. I'll get him to open the door and then I'll stand in the door until you're in the car."

"There, it worked. Now for the financial transaction with the conductor, his slide rule, adding machine and cash register. On our way at last!"

"My, how the car rocks and lunges."

"Yes, it's the track."

"What's the trouble ahead?"

"Looks like a block. Holy smoke! There's a horse down on the track."

"Oh! That confounded track again. This is a heluva note. I'm thankful it's not a fire,—we might be sitting here all day."

"Seems to me I have read of 'trackless trolleys.' Wouldn't they be an improvement?"

"Decidedly. But I reckon the exposed over-head wires won't be tolerated much longer in cities."

"Then it must be the 'Trackless Trolleyless?' "

"Yes, that's the idea exactly. In other words, the motor vehicle bus,—not married to a track or a trolley wire—able to draw up to the curb to receive and discharge passengers safely—independent of a fixed route—and capable of running around emergency traffic, blockades, stalled vehicles and fires."

"By George, you've got the right idea. Why, the busses could be made with two enclosed decks, the first the height of the curb, the second reached by an inside stairway. Every person would be provided with a seat, and there wouldn't be any crowding."

"It would seem that on the less congested runs these vehicles could be handled by one man who would drive and receive fares at the same time."

"Looks to me as if the days of the track and the trolley are numbered."

"Yes, events in London, Paris, New York and Chicago already point that way."—D. C. Fenner, Manager, Public Works Department, International Motor Co.

Keep the Highways Open

Our highways have become such important factors in our transportation schemes that it is just as essential that all roads be kept free of snow and ice in the winter as it is that the railroad tracks be kept clear. Parcel post and express service are as necessary in winter as they are in summer. Food and coal, the most needed commodities at this season of the year, must be carried if they are to reach the consumer.

A campaign to keep the highways 100 per cent. efficient during 365 days of the year is now being waged by the Transport and Travel Bureau of the B. F. Goodrich Rubber Co., Akron, Ohio. Throughout the country, especially in the extreme north, there are innumerable highways, well constructed of brick, macadam and concrete that are clogged with snow and ice during the entire winter and absolutely inaccessible as far as motor truck transportation is concerned.

It is at such roads as these that the Goodrich Company is aiming its campaign as a part of which it has issued a booklet which tells how roads may be kept open even in very severe climates. This booklet will be distributed to all state and county highway engineers and commissioners. It solves the snow problem in two ways, prevention and removal, advocating the former method.

The preventative suggestions include a study of the source of snow drifts and the removal of their causes. However, there are instances when drifts cannot be prevented and in such cases they should be removed. A road grader, an ordinary snow plow, rotary sweepers, etc., are mentioned for this purpose and when these are not to be had the snow, while still loose, may be compacted. This method is not so practical and is not recommended except in extreme cases.

Correction

In the advertisement on page 225 of the December issue of the COMMERCIAL CAR JOURNAL the price of the Koehler Model C truck is quoted at $1855. This is incorrect and should read $1885.

Scott Motor Truck Co., distributors of Rainier motor trucks, have moved into larger quarters in the Sunshine Garage at Atlantic & Classon Aves., Brooklyn, N. Y.

Building a Drive-in Filling Station

(*Continued from page 66*)

equipped with stationery and the windows hung with silk curtains.

Toilets should be equipped with a self-draining non-freezing shut-off valve and they should be religiously shut off with the closing of the station, unless the temperature of the station is kept above the freezing point all night.

Floors and Roofs

Do not build wooden floors unless the station is purely a temporary one and subject to being dismantled in a few months. They are hard to keep clean and soon become oil soaked and dangerous, even with the greatest of care. Concrete floors are naturally cold and therefore a little harder to heat in the latitude of hard winters. However, this can be overcome by the proper installation of the right heating plant. Red Spanish tile makes a good serviceable and attractive floor.

The type of roof employed will materially affect the insurance rates. Do not use wood shingles on account of the danger or the ordinary tin roof on account of the looks.

Earthen tile is the best for sloping roofs, but this means a heavy superframe and an unnecessary expenditure of money. Metal tile or asbestos shingles are recommended for sloping roofs and the prepared gravel or slag roofing for the flat roofs.

Inside and Outside Finish

A great many stations, particularly those owned by individuals, are never finished on the inside. This is a grave mistake. Remember a station, which is attractive in every detail, will draw trade, just as an attractive theatre, restaurant or store.

Plain sheet metal, composition board and matched siding are used extensively and are inexpensive. Plaster on metal lath makes a durable and fairly reasonable method of finishing and can be made very attractive when used in connection with an ornamental steel ceiling. Tile or glazed brick used as an ornamental steel ceiling is probably the most permanent and has the advantage of being easily cleaned and maintained, although more expensive.

Do not build stations entirely of frame. If first cost must be kept to a minimum, use timber frame with cement, or sheet metal finish, or a veneer of common brick or concrete block.

Pressed brick, wire cut brick, concrete or a combination of concrete and brick all make very handsome stations and are reasonable in price. White glass brick, glazed brick and tile are considerably more expensive, but are of long life and low maintenance.

The ceiling of covered driveways should be carefully worked out. They should be of such construction as to be easily kept clean and reflect all possible light. Ornamental steel panels or cement finish will give the best results.

Lighting of Building and Grounds

Nearly all filling stations have the appearance that the owners are afraid to spend money for lighting purposes.

Transient trade will not stop unless they see the station a considerable distance before they get to it, and unless the building and its grounds are well lighted they will not be able to see it at night. Use high candle power lamps and plenty of them. Have a lighting expert specify your reflectors.

A building 14 feet square should have at least two 200-watt lamps inside, not including the toilets and at least four 100-watt lamps on the eaves outside. A safe rule to apply for inside lighting is 200-watts for each 100 square feet on open floor space.

When driveways are covered they should be just as well lighted as the inside of the station and even better. They must be well enough lighted for men to see under hoods and pour lubricating oil without spilling it. They must also be light enough to look into the gas tanks of automobiles.

Ornamental light posts, placed on both sides of the driveway approaches and at other suitable places, not only beautify the grounds, but are also good advertising mediums. These should be equipped with 100-watt bulbs and 14 or 16 inch globes.

Driveways should be thoroughly lighted that there can be absolutely no danger of driver getting off the driveways or having an accident of any kind. Use 100-watt lamps for pumps, etc. Lamps of 60-watt have no place in a filling station, except in toilets, air compressor rooms and the like, unless used in clusters, which requires more expensive fixtures.

Heating Plant and Ventilation

When a basement is used, either a hot water system or a small hot air furnace can be used with good results. If there is no basement, a hot water system or hot blast stove (known as the depot type) is the best. If the hot water system is used without a basement, a section of the floor upon which the plant is installed must be dropped about eighteen inches to care for the returns.

Several companies have tried heating with gas, but the results were very poor. When natural gas is used there is always the liability of a drop in pressure and a reduction of pressure usually accompanies a drop in temperature at a time when heat is most needed. The troubles experienced from low pressure are not experienced when artificial gas is used, but it will be found that it is a very expensive method of heating.

A concrete floor is extremely hard to heat, particularly in a filling station where the doors are being constantly opened and closed. Unless the building is perfectly heated it is almost impossible for attendants to remain free from colds and rheumatism during the winter months.

There is no gas heater built which will properly throw the heat down on the floor. It is also a fact that the air will become dangerously foul and cause a great deal of dampness and sweating inside of the building, unless the mixing valves are adjusted as to secure perfect combustion and the heater properly vented through the roof.

The storage of coal has appeared to be a problem to many operators. When a basement is used the difficulty is quickly solved.

It is just as hard to properly ventilate a filling station as it is to properly heat one. All doors should be equipped with movable transoms. Windows should also be installed, so that they can be raised and lowered at both top and bottom. They should have an inside swinging section if the sashes are of the fixed steel type.

Toilets should be ventilated to the roof and chimneys should be ample in size and carefully constructed.

Portable Building

Portable buildings can be secured at a fairly reasonable figure from a number of the metal fabricating companies located in the various parts of the country. These are shipped "knocked down" and can be assembled without much cost. They can be obtained both with and without covered driveways.

These buildings are supposed to be fireproof, but in a great many cases will not conform to the building codes of some of the larger cities. They are very seldom furnished with a toilet, chimney or room for air compressor. The windows are usually stationary and the doors without transoms.

They are very hard to finish inside in a satisfactory manner and are inclined to be cold in winter and hot in summer. They are very difficult to fasten to a foundation so that they will be immovable from the action of wind or from being run into by a car; also rain, snow and wind will get inside. Roofs and driveway covers are also apt to sag from snow loads. They are good purely as a temporary building which may have to be moved, and for leases of three years or under, five year lease with a 30-day vacation clause and property occupied on a month to month basis.

Napoleon Increases Foreign Shipments

TRAVERSE CITY, MICH., Dec. 18.—Herbert P. Seabrook, English representative of the Napoleon Motors Company, recently visited the factory here and evinced great interest in the plans of the company to establish its export business on a larger scale. These plans include an increase in the size of the export building and the segregation of the foreign business from the remainder of the plant.

Atterbury Models

The Atterbury Motor Car Co., Buffalo, exhibited Model 7CX, 2½-ton pneumatic tire job with stake body; model 7D, 3½-ton chassis; model 8E, 5-ton chassis, and the same sized chassis with dump body fitted with Hydro hoist.

Overhauling and Lubricating the Spicer Universal Joint

By C. P. SHATTUCK

THE following are the methods employed by the Spicer Manufacturing Corporation, South Plainfield, N. J., in the disassembly, repair, lubrication and reassembly of the Spicer universal joints, produced by this company. Instructions are not given in detail for each type or size made, but the directions contained herein may be utilized for any sized joint. The joint described is of slip joint type having a propeller shaft with a splined end. Those repairmen who have never attempted the removal of a shaft with a joint, or who are not familiar with the construction are cautioned against allowing it to fall when attempting its removal. It is suggested that the shaft be so supported by cord or rope. Unless this is done there is a possibility of damaging the inner casing, which may become distorted or bent. This casing is bolted to the flange and the face of each is ground to obtain a perfect fit to prevent escape of the lubricant from the joint.



The Driving Member, Flange With Journal, Bushings and Sleeve Yoke Assembled, Inner and Outer Casings and Lock Nut in Their Order of Assembly

Disassembling the Joint

The best way to disassemble the joint is to place it on the work bench in a vertical plane with the dust cap end uppermost. **Unscrew dust cap from sleeve yoke. Remove nuts and washers of lock nut.** (If lock nut be of split type the halves are secured by two bolts and nuts). Keep coil spring compressed by holding halves of the lock nut and **displace the lock nut bolts (2). Slip off one half of lock nut** and with spring still held compressed **remove other half. Slip off spring and outside casing** or shell. If the latter sticks, do not attempt to pry it loose with a chisel or screw driver, as this member has a packing on the inside which will be damaged. If the casing sticks, tap it gently on its edge, not the side. **Loosen and remove the flange nuts, lock washers and bolts,** using S or open end wrenches. The openings are not given, as the size of the nuts and bolts vary. **Remove inner casing.** The next step is to displace the flange yoke. There is but one way and this is to **drive out the bushings (2) from the flange yoke.** Use a punch, as shown in the accompanying illustration. The flange yoke can now be lifted free from the journal.

Removing Journal Bushings

The journal is mounted in bushings in the sleeve yoke and these bushings are originally constructed with the same dimensions and clearances as the bushings in the flange, consequently they are interchangeable. Those of the sleeve yoke are stationary and are held in position by bushing rings, semi-circular and of tempered steel. These precautionary rings fit in grooves cut in the bushings and yoke and are so designed that the rings lock automatically when inserted and tapped with a hammer. The rings also serve to prevent the bushings coming in contact with the inside casing should lubrication of the joint be neglected and the bushing freeze to the spindle of the journal.

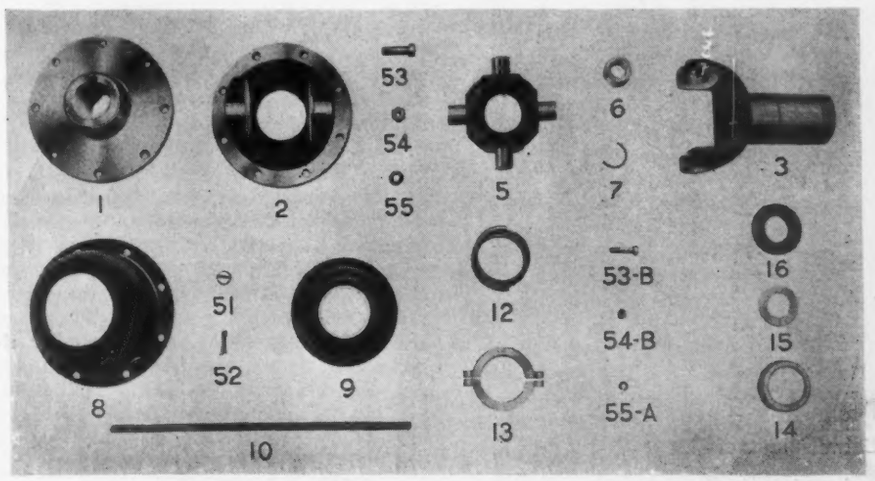
To **remove bushing rings** use a sharp pointed tool, inserting point under ring and pry upward. **Drive out the journal bushings** in the same way as were the flange bushings. If badly worn the bushings will slip out easily and without the aid of a tool. If frozen to the spindle, drive off. **Remove journal from sleeve yoke.** The joint is now entirely disassembled. If lubrication has been neglected and the joint is so badly worn that there was a perceptible shake to it before the work of disassembly was begun, it may be necessary to replace the four bushings with new ones and possibly the journal.

There are several precautions to be observed in the reassembly of the universal joint. We shall assume that four new bushings and a journal are to be replaced. Wash and clean thoroughly the new bushings, journal and the sleeve yoke. Dip the spindle or bearing surfaces of the journal and the bushings in 600 W or similar grade of lubricant. This will provide sufficient lubrication until centrifugal force carries the grease which is later injected into the bearings, etc.

Reassembling Journal, Etc.

Care must be taken to correctly reassemble the journal in the sleeve yoke. If replaced incorrectly the angularity of the joint will be decreased, for with the journal in the reverse positions its side bearing sections will contact with the sleeve yoke and this will occur every quarter revolution of the propeller shaft or through each 90 degrees movement of the joint.

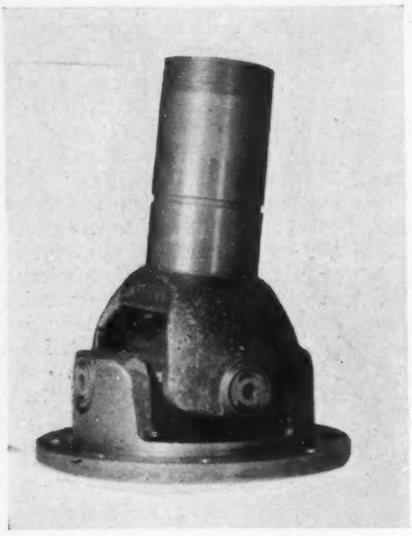
Stand the sleeve yoke on its dust cap end or in a vertical plane. **Insert journal in sleeve yoke** with flat or grooved side uppermost at bearings and with other pair of spindles having their flat side down. An accompanying illustration depicts the correct method of replacing the journal in the sleeve yoke. **Dip**



Showing the Components of the Spicer Universal Joint

1. Flange; 2. Flange Yoke; 3. Sleeve Yoke; 5. Journal; 6. Bushing; 7. Bushing Ring; 8. Inside Casting; 9. Outside Casting; 10. Packing; 12. Spring; 13. Lock Nut; 14. Dust Cap; 15. Steel Washer; 16. Felt Washer; 51. Oil Plug; 52. Cotter Pin; 53. Flang Bolt; 53B. Lock Nut Bolt; 54. Flange Nut; 54B. Lock Nut; 55. Flange Lock Washer; 55B. Lock Nut, Lock Washer.

bushings in lubricant and slip over spindles into the sleeve yoke. Before replacing the bushings make sure that their grooves will align with those in the sleeve yoke. This can be easily determined by placing a bushing in the sleeve yoke before inserting the journal. **Insert or catch bushing** rings and seat by a



The Bushings of Flange Are Removed by a Punch, Driving Bushings Outward. The Punch is Painted White to Show Method of Use.

tap with a hammer. **Dip other pair of bushings in 600 W and slip flange over journal spindles. Insert and drive home bushings** until they seat.

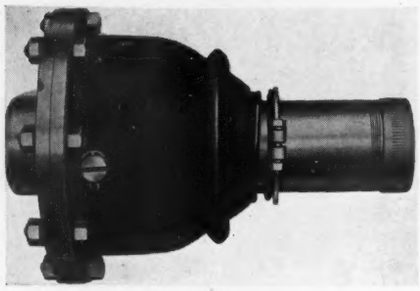
Clean Ground Surfaces

Before replacing the inner casing clean its ground face and that of the flange yoke with gasoline; that is, the contacting faces of these units. The faces must be thoroughly clean and free from any



In Replacing Inner Casing it is Important That Oil Plug Hole be Opposite or Midway Between Lugs of Flange and Sleeve Yoke.

foreign deposits, else lubrication will escape from the joint. The next step is lubrication of the joint proper. Roll into a ball the correct amount of grease required for the size of joint. Use a



The Spicer Universal Joint Assembled and Showing the Split Lock Nut and Its Method of Retention.

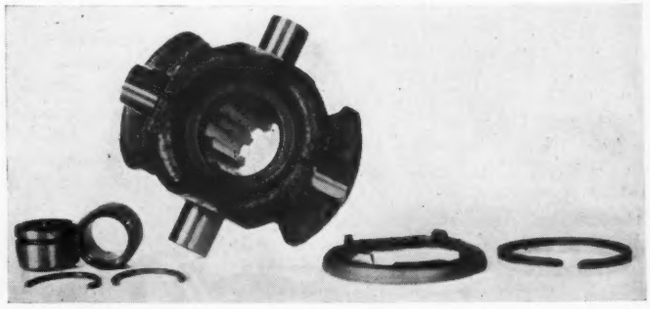
good, high grade grease, one free from acids. And it should be borne in mind that a joint should not be packed too full of grease. Not over 50 per cent. The factory method is by weight and a table of weights for the different size joints follows:

Diameter of Flange	Grease in Ounces
3¼	1
4¼	3
4½	3
5	4½
5½	6
5⅝	6
6⅞	11
8	20

By diameter is meant the widest section of the joint when assembled or the flange member.

Location of Inner Casing Important

An error frequently made by those not familiar with the construction of the joint is to replace the inner casing in such manner as to bring the oil plug hole in such position that when the new



Illustrating the Bushings and Rings Removed From Sleeve Yoke and Proper Method of Replacing Journal.

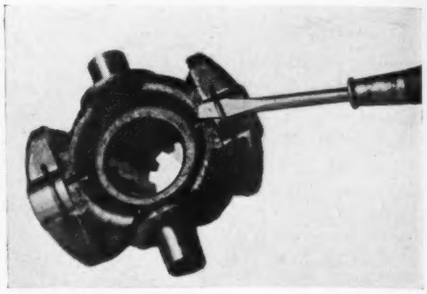
The flange lock and split ring (shown at bottom, right) are used on one side joint only.

supply of grease is injected through the opening that it does not reach the bearings. The holes of the flange, sleeve yoke and inner casing are bored in such manner that when the three are in proper relation to one another the oil plug hole in the inner casing will be opposite or midway between the flange or sleeve yoke or between the lugs of the flange and sleeve yoke. An accompanying illustration shows the assembly and the proper relation of the parts. If assembled in this manner no trouble will be experienced, as the holes of the flange, yoke and inner casing will align and grease injected will reach the bearings.

Replace inner casing, insert flange bolts, replace lock washers (S. A. E.) and catch nuts. The fit of flange, yoke and casing must be a snug one, as previously explained, and the bolts and nuts set up snug. If the casing has been damaged and distorted, it will not seat and seal the joint and a new one should be installed. Tighten the flange nuts in the same manner as the nuts of a cylinder head; that is, partly set up a nut, then the one diametrically opposite, going around several times, not tightening any one finally until all others are nearly down and snug.

Replacing Spring

Slip outer casing over sleeve yoke. See that packing is in good condition. If not replace with new. **Slip spring**



The Bushing Rings Can be Displaced by Inserting Point of Sharp Pointed Tool Between Ring and Groove of Bushing.

over yoke, compress spring by hand sufficiently to permit of inserting one-half of circular lock nut in recess of yoke. Hold with the hand and **insert other half of lock nut. Slip lock nut bolts (2) through both halves, replace lock washers and tighten nuts.** This lock nut cannot be replaced when bolted together, as the inside diameter is less than the outside diameter of the yoke. **Replace dust cap,** using new felt washer, and see that steel washer is inserted first in cap then the felt. **Screw up dust cap,** by hand to a snug fit.

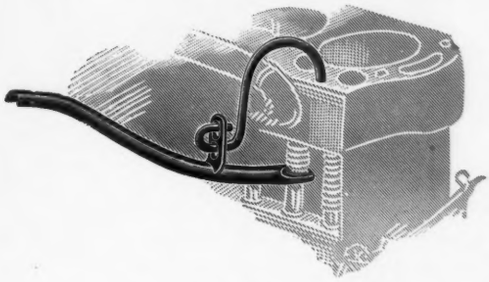
With one size Spicer universal joint the flange lock nut is replaced by a split ring of tempered metal and a circular member. The split ring fits in a recess or groove in the sleeve yoke and the cap fitting over it locks the ring in place. To remove this type of lock compress the spring and free the ring from the groove.

Garford Motor Truck Company, Lima, Ohio, calls the attention of the trade to the fact that it is an independent organization and that it has no affiliation whatsoever with any other automobile or motor truck interests, despite numerous reports to the contrary.

Service Station and Repair Shop Appliances

Valve Lifter for Ford Engine

The Liberty Valve Spring Lifter, manufactured by the Madison Tool & Stamping Works, Inc., Madison, Wis., and sold by the Madison Tool & Stamping Works, Inc., 624 S. Michigan Ave., Chicago, the Department of Sales, is a special tool for those who work upon the



Liberty Valve Spring Lifter
Designed especially for use on the Ford power plant

Ford engine. It is designed particularly for this work, for lifting the valve springs, when removing the valves. It is made of cold rolled steel, very durable in construction and weighs but 14 oz. It will do its work quickly and requires but one hand to manipulate it. The retail price of this tool is $1.

Storage Battery Cell Tester

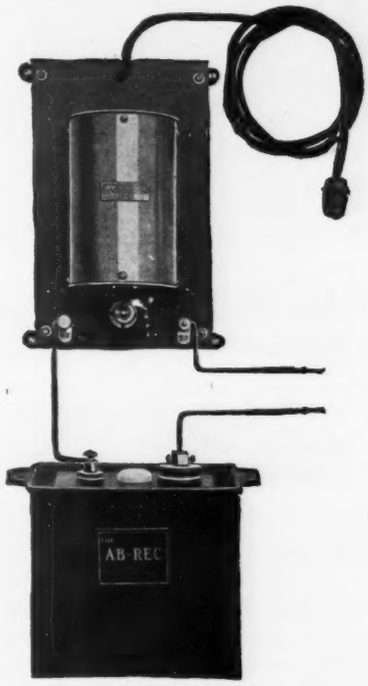
An instrument especially designed to meet the constant demand of the battery and repair man, for a handy device to test each cell of the storage battery separately, is being distributed by the H. B. Shontz Co., Inc., 157 W. 54th St., New York City. Each cell of a battery can be tested individually and under full load. This device will indicate the number of amperes which it delivers, also the voltage of each cell while delivering the amperes. If the cell is strong and healthy, a bright light illuminates on the device. A dim and fading light indicates the cell to be weak, and no light at all when the cell is dead.

Chemical Repair for Scored Cylinders

The Wizard Scored Cylinder Repair Co., 53 Peoples Bank Bldg., Wilkes-Barre, Pa., is repairing scored cylinders by a chemical process, filling up air or sand holes and cuts. The company uses an alloy which is smoothed down to the surface of the cylinder. The same pistons and rings are used. The alloy is stated to have unusual heat-resisting qualities and forces its way into the pores of the iron so that it cannot work out.

Rectifier for Charging Batteries

The American Battery Co., 1132 Fulton St., Chicago, Ill., are in production with a new device known as the Ab-rec rectifier which enables the charging of practically any voltage storage battery from an alternating current circuit. The plug of this device can be readily attached to any conventional socket where there is alternating current and the two wires are connected from the Ab-rec terminals to the storage battery to be charged. The current is then turned on as the battery will receive transformed direct current.



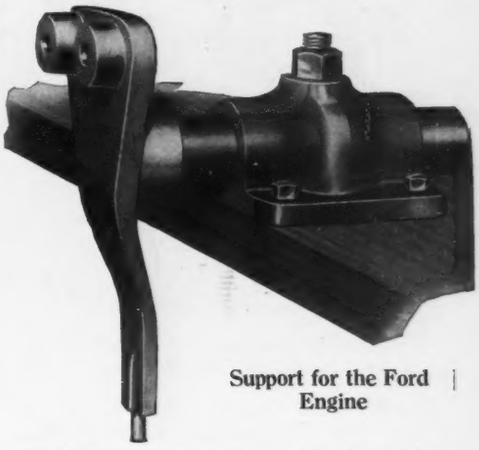
Ab-Rec Rectifier
Charges 6, 8, 12, 18 or 20 volt storage batteries from an alternating current circuit

When charging a six-volt battery approximately two amperes are passed, whereas in charging batteries of higher capacity there is a slight decrease in the amperage. This device consists of few parts and the maker claims that it will last about a year, but this is entirely dependent on the amount of work done. It might then be necessary to replace the two small electrodes which become consumed and replace the fluid. For operating on alternating current, circuits of from 50 to 125 volts pressure, the price is $24. The ammeter is furnished at an additional cost of $8. The weight complete is 45 lb. and the dimensions of the shipping box is 16 x 16 x 13.

New Appliances Seen at the New York Show Are Described in the Front Section of This Issue.

Motor Block for Work Bench

A new time and labor saving device for the Ford repair shop is being offered to the trade by the Auto Mechanic's Tool Co., Peoria, Ill. It is known as the Motor Block Support. It is designed to support the motor block in position while adjusting the magneto. The support arm



Support for the Ford Engine

is bolted to the engine with the exhaust water pipe bolted when removed from the chassis. The pin end of the arm is slipped into the crankcase bolt hole and acts as a guide only, carrying no weight. The arm with the engine attached revolves on the spindle and can be turned to any desired position and retained by tightening one screw. The arm, which is three inches longer than the bearing box, enables the magneto to clear the work bench. It retails at $14 f.ob. Peoria.

Portable Truss

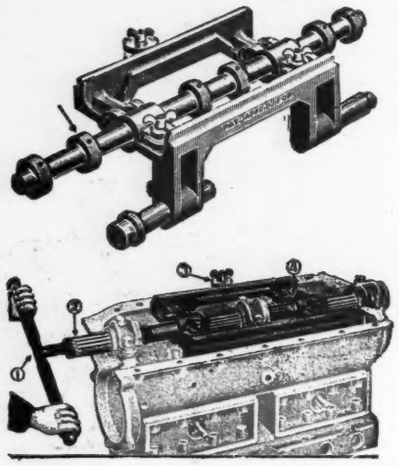
Easy access to the underside of truck combined with comfortable working conditions is the result obtained in using the new product offered to the trade by the Portable Tool Supply Co., Inc., Association Service Bldg., 256 Main St., Buffalo, N. Y. This device is a truss. The water flows freely.
accompanying illustration shows this device in position. It is made of rigid steel tubes and heavy angles that are mounted upon heavy castors to facilitate the moving of the car when raised. A convenient tray is included for tools and parts. The size of this support is 18 in. wide, 26 in. long and 24 in. high. The list price is $35.



Combined Truss and Tray

Combination Reamer and Rebabbitting Outfit

A new combination reamer and rebabbitting outfit has been brought out by the Dual Mfg. Co., of 1424 Nicollet Ave., Minneapolis, Minn. It is particularly adapted for repair work on a Ford



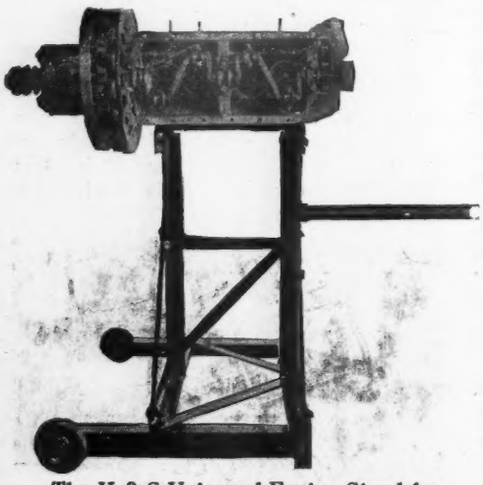
Combination Reamer and Rebabbitting Machine for Ford Repairs

engine. Two points of this fixture are attached in the camshaft bushing holes, thus aligning the crankshaft with the block and in correct mesh with the camshaft gears.

The frame of this device is a gray iron casting carefully machined and enameled, and the reamer is tool steel, ground, hardened and fitted. The re-babbitting arbor is of steel, ground and polished and has an adjustable knurled collar and caps for pouring the babbitt. After the frame has been attached either device can be attached to replace the other. The dealer's price on this outfit is $60, f.o.b. Minneapolis.

Stand for Ford Engines

The Water Street Garage & Machine Co., South Brownsville, Pa., is marketing a stand upon which the Ford power plant can be easily placed for overhauling. It is known as the K & S Universal Engine Stand. Its design is such that it affords accessibility to any part of the plant requiring repairs. Still greater accessibility is facilitated by merely shifting the engine in any position desired. When assembling, it permits the crankcase transmission, intake and exhaust manifolds, etc., to be assembled complete on the repair stand, from whence the entire plant can be placed in the car as a unit. But one screw is required in making the attachment on the repair stand. The stand is made of angle and tee channels, securely riveted and reinforced at the corners. The price for the outfit is $35.



The K & S Universal Engine Stand for Ford Engines

Vulcan Tool Holders

Vulcan Forged Cutter Tool Holders are a recent addition to the well known line of Agrippa Tool Holders manufactured by J. A. Williams & Co., Buffalo, N. Y. The construction of this tool is said to eliminate the great cost of the old, solid tool and at the same time retains its advantages. It is adaptable to the heaviest service in any regular machining operation on lathe, planer, shaper, etc.

The holders are all dropped forged from a fine grade of special steel, so

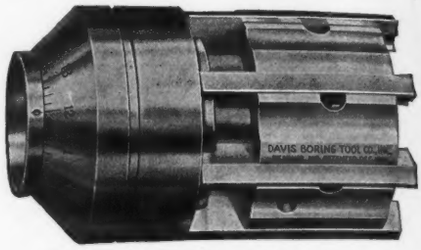


Phantom View of the New "Vulcan" Forged Cutter Tool Holder Complete and a Full View of the Holder and Cutter

heat-treated as to develop its maximum toughness and stiffness. The construction is simple, consisting of three parts, namely, holder, square head cam and locking pin. The cutter is held in an immovably rigid grip. The construction is clearly presented by the accompanying illustration. The cutters, extra heavy in design, are drop-forged from Agrippa high-speed steel and are finished and hardened ready for use. They are furnished in a wide range of sizes and types: Diamond Point, Roughing, Hog Nose, Flat Nose, Threading, etc. The angular seat on the rear of the shoulder permits the locking pin to force the head, or step, of the shoulder directly against the holder proper. This method of locking provides the necessary bearing to support the cutting pressure and prevents all rocking movement of the cutter itself.

The Davis Expansion Reamer

The Davis Boring Tool Co., Inc., St. Louis, Mo., manufacturer of Davis Expansion Tools, has brought out a new expansion reamer. This product, known as the Davis Expansion Reamer, is featured by a bottoming action. This is made possible because the blades extend beyond the reamer body and their action is forward as expansion is required. The reamers are adjustable for any method of drive for any machine. Various sizes of pilots or guides also may be had if desired. They are also made with a solid shank, straight or taper to which a float-



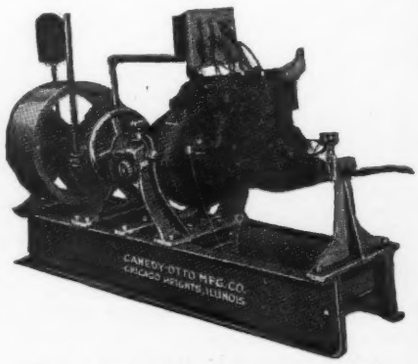
The New Davis Expansion Reamer

ing holder may be applied. Blade expansion is controlled by a micrometer adjustment which acts for both the expanding and receding of the blades. Three groups of blades are necessary to cover sizes ranging from 1⅝ to 6 in. inclusive.

Burning-in and Testing Machine for Ford Engines

A completely burning-in and testing machine for the Ford power plant is being produced by the Canedy-Otto Mfg. Co., Chicago Heights, Ill. This device is especially well adapted to service stations and automobile repair shops. It requires but 6 to 10 hp. to operate.

The maker states there is no vibration to this machine, due to its rigid construction and proper balance. The net weight is 775 lb., height 32 in., width 18 in., diam.



The Canedy-Otto Burning-in Machine

of flywheel 23 in., length overall 76 in., total width 28 in. Flywheel weighs 350 lb. and has a 9-in. face.

Detroit Trailer Company, Detroit, Mich., manufacturers of 2 and 4 wheel motor truck trailers, announce that they have opened a New York office on the seventh floor of the Grand Central Palace and will be pleased to have dealers call during show week and examine their products. Their office will remain open until 10 P. M. and no charge will be made for admission.

Replacement Table. Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter will be found either the size of the main air intake or the gasoline fuel line

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outer Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R	3	1/4	1	.....	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB	3	1/4	1	.....	11 1/2	3 1/2	1/4	2	11 1/2	3 1/2	1/4	2	112	34
Acason H	3	1/4	1 1/4	.....	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	130	35
Acason L	3	1/4	1 1/4	.....	16	3 3/4	1/4	2	16	3 3/4	1/4	2	137	35
Acason M	3	1/4	1 1/4	.....	18	4 1/2	1/4	2	18	4 1/2	1/4	2	167 1/2	35
Ace, Series A1 1/2	3	....	1 1/8	1 3/4	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122 1/2	32
Ace, Series A2 1/2	3	1/8	1 1/8	1 3/4	13 1/2	3 1/4	1/4	4	13 1/2	3 1/4	1/4	4	144 1/2	32
Acme B	3	1/8	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	116 3/8	34
Acme F	3	1/8	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	124 3/8	34
Acme A	3	1/8	1 1/2	.....	14	3 1/2	1/4	4	14	3 1/2	1/4	4	135 1/2	34
Acme C	3	1/8	1 1/2	.....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	150 1/2	36
Acme E	3	1/4	1 1/2	.....	18	4	1/4	4	18	4	1/4	4	160	37
All-American A	3	1/8	1 1/4	1 11/16	42 1/2	2	1/8	1	39 11/16	2	1/8	1	104	31
Apex C	3	1/8	1	1 1/4	42	2	....	1	41 1/2	2	....	1	102	35
Apex D	3	1/8	1	1 1/4	42	2	....	1	41 1/2	2	....	1	102	35
Apex E	3	1/4	1	1 1/4	54	2 1/4	....	1	53 1/4	2	....	1	128	31 1/2
Armleder KW	3	1/8	1 1/4	1/8	42	3	1/8	1	16	3 3/4	1/4	8	150	39
Armleder HW	3	1/8	1	1/8	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	140	30
Atterbury 7R	3	1/4	1 1/4	5/8	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	115 3/8	34
Atterbury 7CX	3	1/4	1 1/4	5/8	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	133 3/8	34
Atterbury 7D	3	1/4	1 1/4	5/8	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	145 3/8	37 1/2
Atterbury 8E	3	1/4	1 1/2	5/8	17 11/16	4	1/4	4	17 11/16	4	1/4	4	157 7/8	37 1/2
Autocar XXI-F	4	1/8	1 1/8	....	16 1/4	2 1/2	1/4	4	13	2 1/2	1/4	4	91	34
Available H2	3	1/8	1 1/8	1 1/8	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	Opt	32
Available H2 1/2	3	1/8	1 1/8	1 1/8	....	....	....	....	....	....	....	....	Opt	32
Available H3	3	1/8	1 1/8	1 11/16	16	3 3/4	1/4	4	16	3 3/4	1/4	4	Opt	36
Available H5	3	1/4	1 1/8	1 11/16	16	4	1/4	4	16	4	1/4	4	Opt	38
Beck-Hawkeye A	....	....	1 1/2	1 1/4	24	2	1/8	1	24	2	1/8	1	114	54
Beck-Hawkeye B	....	....	1 1/2	1 1/4	24	2	1/8	1	24	2	1/8	1	114	66
Beck-Hawkeye C	....	....	1 3/4	1 1/2	25	2 1/4	1/8	1	25	2 1/4	1/8	1	108	66
Beck-Hawkeye D	3	1/8	1 3/4	1 1/2	25	2 1/4	1/8	1	25	2 1/4	1/8	1	108	72
Belmont A	....	....	1	1 1/2	32	2	1/8	2	31	1 1/2	1/8	2	78	34
Belmont B	....	....	1	1 1/2	41	2	1/4	2	40	1 1/2	1/4	2	120	36
Belmont C	....	....	1	1 3/4	41	2 1/2	1/4	2	40	2	1/4	2	124	36
Bessemer G	....	....	1	1/8	47 1/2	2 3/8	1/8	2	45 1/2	2 1/4	1/8	2	98	34
Bessemer H2	....	....	1	1/8	56 1/2	2 1/2	1/8	2	55	2 1/4	1/8	2	116	34
Bessemer J2	....	....	1 1/4	1/8	56 1/2	2 1/2	1/4	2	55	2 1/4	1/8	2	141	34
Bessemer K2	....	....	1 1/4	1/8	58 1/2	3 1/2	1/8	2	30 1/4	4 1/2	1/8	1	157 1/2	38
Bethlehem D	3	1/4	1	1/4	43	2 1/2	1/8	2	40 1/8	1 3/4	1/8	2	120	34
Bethlehem E	3	1/4	1	1/4	51	3	1/8	2	49	2	1/8	2	138	34
Bethlehem F	4	1/4	1	1/4	55	3	1/8	2	50	2	1/8	2	156	34
Brinton F	3	1/8	1 1/16	3/4	13	3 1/2	1/4	8	13	3 1/2	1/4	8	135 1/2	33
Briscoe T34	....	....	1	1 1/4	39	1 3/4	1/2	2	43 11/16	2 1/2	1/2	2	98 1/2	34
Brockway S	3	1/8	1	.....	20	2	1/8	4	20	2	1/8	4	118	32
Brockway K	3	1/8	1 1/4	.....	12	3 3/8	1/8	4	12	3 3/8	1/8	4	136 1/2	34
Brockway R	3	1/8	1 1/4	.....	15 5/8	3 3/4	1/8	4	15 5/8	3 3/4	1/8	4	154 1/2	36
Brockway T	3	1/4	1 1/4	.....	18	4	1/8	4	18	4	1/8	4	153	36
Chicago C1	....	....	1	.....	13	3 1/4	1/4	4	13	3 1/4	1/4	4	111	36
Chicago C1 1/2	....	....	1	.....	13	3 1/4	1/4	4	13	3 1/4	1/4	4	125	36
Chicago C2 1/2	....	....	1 1/4	.....	13	3 1/2	1/4	4	13	3 1/2	1/4	4	135	36
Chicago C3 1/2	....	....	1 1/4	.....	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	180	36
Clydesdale 120B	3	1/4	1 11/16	1/8	18	4	1/4	4	18	4	1/4	4	207	38
Clydesdale 90	3	1/8	1 5/8	1/8	16	3 3/4	1/4	4	16	3 3/4	1/4	4	166 1/2	38
Clydesdale 65X	3	1/8	1 1/16	1/8	13 1/4	3 1/2	1/4	4	13 3/4	3 1/2	1/4	4	137	33 1/4
Clydesdale 42	3	1/8	1 1/16	1/8	12	3 1/4	1/4	4	12	3 1/4	1/4	4	117 1/2	34
Clydesdale 32X	3	1/8	1 1/16	1/8	20	1 3/4	1/4	4	20	1 3/4	1/4	4	117 1/2	34
Columbia G	....	....	1 1/4	....	55	3	1/8	2	50	2	1/8	2	132	32 1/2
Columbia F	3	1/8	1	....	39 1/4	2 1/2	1/8	2	40 1/2	1 3/4	1/8	2	108	32 1/2
Columbia E	3	1/8	1 1/4	....	55	3	1/8	2	50	2	1/8	2	132	32 1/2
Comet	4	1/8	1	1	17 1/4	2 1/4	1/8	2	17 1/4	1 1/2	1/8	2	100	36
Commerce E	3	1/8	1	1/8	45	2 1/2	1/8	2	43	2 1/4	1/8	2	92	34
Commerce EP	3	1/8	1	1/8	45	2 1/2	1/8	2	43	2 1/4	1/8	2	100	34
Conestoga 12	....	....	1	1/8	39	2	1/8	1	39	2	1/8	1	86	34
Conestoga 20	3	1/8	1	1/8	22	2 1/2	1/8	2	14	2 1/2	1/8	2	96	32
Conestoga 30	3	1/8	1	1/8	22	2 1/2	1/8	2	14	2 1/2	1/8	2	120	32
Corbitt E	3	1/8	1	1/8	19	2	1/8	2	19	2	1/8	2	105	34
Corbitt D	3	1/8	1 1/4	1/8	45 1/4	2	1/4	1	35 1/4	2	1/4	1	120	34
Corbitt C	3	1/8	1 1/4	1/8	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt B	3	1/8	1 1/4	1/8	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt AA	3	1/4	1 1/2	1/8	69 1/4	3	1/4	1	69 1/4	3	1/4	1	160	38
Corbitt A	3	1/8	1 1/4	1/8	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	35
Couple Gear HC	....	....	2	1 3/4	48	3	1/4	2	....	....	....	....	168	42
Couple Gear AC	....	....	2	1 3/4	48	3	1/4	2	....	....	....	....	168	42
Couple Gear LO	....	....	2	1 3/4	48	3	1/4	2	....	....	....	....	168	42
Dart E	3	1/4	....	....	....	....	....	....	....	....	....	....	102	34
Dart CC	3	1/8	....	....	....	....	....	....	....	....	....	....	112	34
Dart L	3	1/4	....	....	....	....	....	....	....	....	....	....	124	34
Dart	....	....	....	....	....	....	....	....	....	....	....	....	144	38
Day-Elder A	3	1/8	1 11/16	1 1/8	47	2 1/2	1/8	1	33 1/2	2 1/2	1/8	1	103	35
Day-Elder B	3	1/8	1 11/16	1 1/8	47	2 1/2	1/8	1	33 1/2	2 1/2	1/8	1	120	35
Day-Elder D	3	1/8	1 11/16	1 1/8	48	2 1/2	1/8	1	33	2 1/2	1/8	1	151 3/4	35
Day-Elder C	3	1/4	1 11/16	1 1/8	57	2 1/2	1/8	1	43	2 1/2	1/8	1	151 3/4	35
Day-Elder F	3	1/8	1 11/16	2	57	2 1/2	1/8	1	43	2 1/2	1/8	1	145	35
Day-Elder E	3	1/4	1 11/16	2	68	3	1/4	4	68	3	1/4	4	155	37
Dearborn BW	3	....	1	....	16 1/2	2 1/2	1/8	2	16 1/2	1 1/2	1/8	2	112	32
Dearborn F	3	1/4	1	....	16 1/2	2 1/2	1/8	2	16 1/2	1 1/2	1/8	2	93	36
Dearborn C	....	....	....	3/4	38	2	1/8	1	38	2	1/8	1	107	32
Defiance B	3	1/8	1	....	45	2 1/2	1/8	1	43 1/2	2 1/4	1/8	1	116	34
Defiance C	3	1/8	1	....	54 1/16	2 1/2	1/8	1	52 1/2	2 1/4	1/8	1	116	34
De Kalb E2	3	1/8	1 1/4	1 1/4	28	3 1/2	1/8	1	28	3 1/2	1/8	1	120	30
De Kalb E2 1/2	3	1/8	1 1/4	1 1/4	28	3 1/2	1/8	1	28	3 1/2	1/8	1	132	32
Denby 12	3	1/8	1	.....	43 1/2	2 1/2	1/8	1	39 1/2	1 3/4	1/8	1	95	34

Replacement Table—Continued

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Denby 134	3	1/16	1	.....	51 1/4	2 1/2	1/16	1	47	2	1/16	1	129	34
Denby 25	3	1/16	1 1/4	.....	55 3/4	3	1/16	1	51	2	1/16	1	142	34
Denby 27	3	1/16	1 1/4	.....	61 1/2	3	1/16	1	58	2 1/2	1/16	1	186	34
Denby 210	3	1/16	1 1/4	.....	89	2 1/4	1/16	1	89	2 1/4	1/16	1	186	34
Diamond T-J5	3	1/16	1	1 1/4	12 1/2	3 1/4	1/4	8	12 1/2	3 1/4	1/4	8	97 1/4	34
Diamond T-J4	3	1/16	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	128 1/4	34
Diamond T-J3	3	1/16	1 1/4	1 1/2	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	129 1/2	34
Diamond T-LB	3	1/16	1 1/4	1 1/2	16	3 3/4	1/4	8	16	3 3/4	1/4	8	142 1/2	37
Diamond T-R	3	1/16	1 1/4	1 1/2	18 1/2	4	1/4	8	18 1/2	4	1/4	8	154 1/2	37
Diamond T-S	3	1/16	1 1/4	1 3/4	18 1/2	4	1/4	8	18 1/2	4	1/4	8	156 3/8	37
Diamond T-FS&T	3	1/16	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	123 1/4	34
Diehl A	3	.....	1	1	28	2 1/2	1/16	2	27	2	1/16	2	90	.....
Doane 2½	3	1/4	1 1/4	1/16	34 1/2	3	1/4	2	34	3	1/16	4	126	53
Doane 6	3	.....	1 1/2	1/16	37 1/2	3	1/4	2	46	4	1/16	4	168	64
Dodge	3	1/16	1	1/16	19 1/4	2 1/2	1/16	2	14 3/4	1 3/4	1/16	2	47 3/8	38
Dorris K4	3	1/4	1 1/4	1 1/4	13 1/2	3 1/2	1/4	4	.....	.....	.....	.....	142 1/2	34
Dorris K7	3	1/4	1 1/4	1 1/4	15 3/4	3 3/4	1/4	4	.....	.....	.....	.....	180 7/8	34
Duplex E	3	1/4	1 1/4	1	9 1/2	2 1/2	1/4	2	5 1/2	2 1/2	1/4	2	126	39 3/8
Ellsworth 25A	3	1/16	1 1/4	1 1/4	12	1 1/4	1/4	4	12	1 1/4	1/4	4	Opt	36
Evans 2	3	1/16	1 1/4	1/4	54	2 1/2	3/8	2	51	2 1/2	3/8	2	120 1/4	34
Fageol 1½	.....	.....	1 1/16	1 1/2	19 1/4	1 3/4	1/16	2	19 1/4	1 3/4	1/16	2	120	30
Fageol 2½	3	1/4	1 1/16	1 1/16	13 1/4	3 1/2	1/4	2	13 1/4	3 1/4	1/4	2	135	34
Fageol 4500	3	1/4	1 5/8	2	15 1/2	3 3/4	1/4	2	15 1/2	3 3/4	1/16	2	161 1/4	37 3/4
Fageol 5300	3	1/4	1 5/8	2	18	4	1/16	2	18	4	1/16	2	161 1/4	37 3/4
Famous B10	3	1/16	1	1/16	21	2 3/4	1/4	1	48	2	1/16	2	94	34
Famous B12	3	1/16	1	1/16	21	2 1/2	1/4	1	48	2	1/16	2	94	34
Fargo O17	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Fargo P18	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Fargo P19	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Fargo P20	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Federal SD	3	1/16	1	1/16	10 31/32	3	1/4	4	10 31/32	3	1/4	4	112	34
Federal TE	3	1/16	1 1/4	1 1/2	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	120	34
Federal UE	3	1/16	1 1/4	1 1/2	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	160	34
Federal WD	3	1/16	1 1/4	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	192	38
Federal XC	3	1/16	1 1/4	1 1/2	17 11/16	4	1/4	4	17 11/16	4	1/4	4	192	38
Federal Light Duty	3	1/16	1 1/4	1 1/2	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	88	34
Federal Heavy Duty	3	1/16	1 1/4	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	84	38
Ford T	3	1/4	1 1/8	1 1/16	23 3/8	1 11/16	1/4	1	12	1 5/8	1/16	2	123 33/32	32
F.W.D. B	3	1/4	1 1/16	1/16	27	3 1/2	1/4	1	43	2 3/4	1/4	2	136	36
Gabriel E	3	1/4	2 1/4	1 3/4	....	3 1/4	1/4	4	13	3 1/4	1/4	4	144	33
Gabriel F	.....	.....	2 1/2	1 3/4	....	3 3/4	1/4	4	16	3 3/4	1/4	4	144	37
Garford 25	3	1/16	1	.....	11 3/4	3 1/4	1/4	4	11 3/4	3 1/4	1/4	4	103	34
Garford 70B	3	1/4	1 1/4	.....	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	121	34
Garford 77D	3	1/4	1 1/4	.....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	36
Garford 77C	3	1/4	1 1/4	.....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	150	32
Garford 68	3	1/4	1 1/4	.....	10 1/2	4	3/8	2	21 5/8	4	1/4	4	150	32
Gary F	3	1/4	1 1/4	3/8	22 1/2	3	1/4	2	22 1/2	3	1/4	2	114	34
Gary GT	3	1/4	1 1/2	3/8	24	3 1/4	1/4	2	24	3 1/4	1/4	2	120	34
Gary J	3	1/4	1 1/2	3/8	27	3 1/2	1/4	2	27	3 1/2	1/4	2	120	34
Gary KT	3	1/4	1 1/2	3/8	32	3 3/4	1/4	2	32	3 3/4	1/4	2	128	36 3/4
Gary M	.....	.....	1 3/4	3/8	36 1/2	4	1/4	2	36 1/2	4	1/4	2	168	39
Gersix K	3	1/4	1 1/4	1 1/2	20	2 1/2	1/4	4	47	2 1/4	1/4	2	131	34
Gersix M	3	1/4	1 1/4	1 1/2	46	2	1/4	2	46	2	1/4	8	114	32
Giant 14	3	1/16	1	.....	19	2	1/16	8	19	2	1/16	8	116 1/2	33
Giant 15	3	1/16	1	.....	19	2	1/16	8	19	2	1/16	8	198	32
Giant 16	3	1/16	1 1/4	.....	45 1/2	2	1/16	4	45 1/2	2	1/16	4	110 1/2	33
Giant 17	3	1/16	1 1/2	.....	56 1/2	2 1/2	1/4	4	46 1/2	2 1/2	1/4	4	183 1/2	36
G.M.C. 16	3	1/16	1	1	43 1/16	1 7/8	1/16	2	43 1/16	1 7/8	1/16	2	.....	.....
G.M.C. 31A	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	101	33
G.M.C. 31B	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	125	33
G.M.C. 41A	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	126	33
G.M.C. 41B	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	150	33
G.M.C. 71A	3	1/16	1 1/4	1 1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	38
G.M.C. 71B	3	1/16	1 1/4	1 1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	192	38
G.M.C. 101A	3	1/16	1 1/4	1 1/4	17 11/16	4	1/4	4	17 11/16	4	1/4	4	144	38
G.M.C. 101B	3	1/16	1 1/4	1 1/4	17 11/16	4	1/4	4	17 11/16	4	1/4	4	192	38
Gramm-Bernstein 15	3	1/16	1	.....	50	2	....	1	50	2	....	1	120	32
Gramm-Bernstein 15-Worm	3	1/16	1	.....	49	1 3/4	....	1	49	1 3/4	....	1	120	32
Gramm-Bernstein 20	3	1/16	1 1/4	.....	50	2	....	1	50	2	....	1	126	32 1/8
Gramm-Bernstein 25	3	1/4	1 1/4	.....	56 1/2	3 1/2	....	1	.....	.....	....	1	132	36
Gramm-Bernstein 35	3	1/4	1 1/4	.....	66	2 3/4	....	1	66	2 3/4	....	1	144	36
Gramm-Bernstein 50	3	1/4	1 1/2	.....	75 1/2	3 3/4	....	1	75 1/2	2 3/4	....	1	162	36
Grant 12	3	1/4	1 1/16	.....	42 1/4	2	1/16	2	41 1/16	2	1/16	2	84	35
Grant 10	3	1/4	1 1/16	.....	45	2 1/2	1/16	2	43 1/16	2 1/4	1/16	2	107	35 1/8
Grant 11	3	1/4	1 1/16	.....	45	2 1/2	1/16	2	43 1/16	2 1/4	1/16	2	134 1/2	35 1/8
Grant 15	3	1/4	1 1/16	.....	54 1/16	2 1/2	1/16	2	52 1/8	2 1/4	1/16	2	107	35 1/8
Grant 16	3	1/4	1 1/16	.....	54 1/16	2 1/2	1/16	2	52 1/8	2 1/4	1/16	2	134 1/4	35 1/8
Hall 2-Worm	.....	.....	.....	.....	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	144	38
Hall 3½-Worm	3	1/16	.....	.....	16	3 3/4	1/4	2	16	3 3/4	1/4	2	180	39
Hall 5-Worm	.....	.....	.....	.....	18 1/2	4	1/4	2	18 1/2	4	1/4	2	144	39
Hall 5-7-Chain	.....	.....	.....	.....	37	2 1/2	1/16	1	59	4	1/4	1	180	39
Harvey WEA	4	1/4	.....	.....	46	2	1/4	2	46	2	1/4	2	120	32
Harvey WFA	4	1/4	.....	.....	52	2 1/4	1/4	2	52	2 1/4	1/4	2	126 1/2	32
Harvey WHA	4	1/4	.....	.....	56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	35
Harvey WKA	4	1/4	.....	.....	69	3	1/16	2	69	3	1/16	2	144	37
Hawkeye K	.....	.....	1 1/4	.....	48	2	1/16	2	47	1 1/2	1/16	2	94	34
Hawkeye M	.....	.....	1 1/4	.....	54	2 1/2	1/16	2	52	2	1/16	2	94	34
Hendrickson I	3	1/4	1 1/4	1/16	12	3 1/2	1/16	4	12	3 1/2	1/16	4	Opt	32 1/2
Hendrickson J	3	1/4	1 1/4	1/16	16	3 3/4	1/16	4	16	3 3/4	1/16	4	Opt	36
Hendrickson K	3	1/4	1 1/2	1/16	18	4	1/16	4	18	4	1/16	4	Opt	38
Highway-Knight A	.....	.....	1 1/2	.....	57	2 1/2	1/4	1	57	2 1/2	1/4	1	150	38
Highway-Knight B	.....	.....	1 1/2	.....	69	3	1/4	1	69	3	1/4	1	150	38
Higrade A18	.....	.....	1	1	12	1 1/2	1/4	2	12	1 1/2	1/4	2	85	32
Higrade B20	.....	.....	1 1/8	1 1/8	18	2	1 1/4	2	18	2	1 1/4	2	102	32
Hood C	3	1/4	1	1/4	23	1	1/16	2	23	2 1/2	1/16	2	30	23
Hoover 15B	3	1/16	1	1 3/4	16	1 3/4	1/16	2	16	1 3/4	1/16	2	82	48
Hoover 20A	3	1/16	1	1 3/4	19	2	1/16	2	19	2	1/16	2	105	54
Huffman B	3	1/16	1	1/16	44	2 1/4	1/8	2	44	1 1/2	1/8	2	123	32
Huffman C	3	1/16	1	1/16	46	2 1/2	1/8	2	44	2 1/4	1/8	2	123	32
Hurlburt 1½	3	.....	1 1/4	1	22	2	1/4	2	22	2	1/4	2	132	35 1/2
Hurlburt 2	3	1/16	1 1/4	1	24	2 1/2	1/4	2	23	2 1/2	1/4	2	144 1/2	34
Hurlburt 3½	3	1/4	1 1/2	1 1/4	26	3	1/4	2	25	3	1/4	2	144 1/2	34
Hurlburt 5	3	1/4	1 1/2	1 1/4	28	3	1/4	2	27	3	1/4	2	144 1/2	34
Independent B, Youngstown, O.	3	.....	1	1/16	43	2 1/2	1/4	2	38	1 1/4	1/4	2	108	34
Independent E, Youngstown, O.	3	.....	1	1/16	43	2 1/2	1/4	2	38	1 3/4	1/4	2	108	33
Independent F, Youngstown, O.	3	.....	1 1/4	1/16	51	3	1/4	2	46	2	1/4	2	110	33 3/4
Indiana 12	3	1/4	1	.....	17 1/2	2	1/16	8	17 1/2	2	1/16	8	108	32
Indiana 20	3	1/4	1 1/4	.....	44	2	1/4	4	44	2	1/4	4	126	33
Indiana 25	3	1/4	1 1/4	.....	51	2 1/4	1/4	4	51	2 1/4	1/4	4	138	33
Indiana 35	3	1/4	1 1/4	.....	56	2 1/4	1/4	4	56	2 1/4	1/4	4	144	34 1/2
Indiana 50	3	1/4	1 1/4	.....	68	3	1/4	4	68	2 1/4	1/4	4	156	37 1/2
International H	3	1/16	1.7	1 1/4	43 3/4	2 1/4	1/16	2	43 3/4	2 1/4	1/16	2	67 7/8	34
International F	3	1/16	1.7	1 1/4	43 3/4	2 1/4	1/16	2	43 3/4	2 1/4	1/16	2	88 3/4	34
International K	3	1/16	1.7	1 1/4	50 5/8	2 1/4	1/16	2	50 5/8	2 1/4	1/16	2	92 11/16	34
International G	4	1/4	1.7	1 1/4	50 5/8	2 1/4	1/16	2	50 5/8	2 1/4	1/16	2	99 3/8	34
International L	4	1/4	1.7	1 1/4	74 11/16	2 1/2	1/16	2	74 11/16	2 1/2	1/16	2	169	34
Jones 31A	3	1/16	1	1/16	41 11/16	2 1/2	1/4	2	39 1/4	1 3/4	1/4	2	100 1/2	36
Jumbo O	3	1/4	1 1/4	.....	51 1/4	3	1/16	1	48 3/4	2 1/2	1/16	1	116	34
Jumbo E	3	1/4	1 1/4	.....	51 1/4	3	1/16	1	48 3/4	2 1/2	1/16	1	159	34
Jumbo C	3	1/4	1 1/4	.....	51 1/4	3	1/16	1	48 3/4	2 1/2	1/16	1	72	34
Kalamazoo G	3	1/4	1 1/16	.....	50	2 1/2	1/16	1	.....	2 1/2	1/16	1	126	32 1/2
Kalamazoo H	3	1/4	2 1/16	.....	90	2 1/2	1/16	1	48	2 1/2	1/16	1	148	33
Kalamazoo K	3	1/4	2 1/16	.....	60	2 1/2	1/16	1	60	2 1/2	1/16	1	151	36
Kankankee E	3	1/4	1 1/16	1 1/4	51	3	1/16	2	50	2	1/16	2	148	32
Keldon 19	4	1/16	1 1/4	1 1/4	48	3	1/16	1	45	3	1/16	1	132	34
Kelly-Springfield K31	3	1/4	1	1/16	16 3/4	1 7/8	1/16	4	16 3/4	1 7/8	1/16	4	141	34
Kelly-Springfield K32	3	1/4	1	1/16	17 3/8	1 7/8	1/16	4	17 3/8	1 7/8	1/16	4	141	34
Kelly-Springfield K35	3	1/4	1	1/16	16 3/4	1 7/8	1/16	4	16 3/4	1 7/8	1/16	4	141	34
Kelly-Springfield K36	3	1/4	1	1/16	17 3/8	1 7/8	1/16	4	17 3/8	1 7/8	1/16	4	141	34
Kelly-Springfield K40	3	1/4	1 1/2	1/16	21	2 1/8	1/16	4	21	2 1/8	1/16	4	145	38
Kelly-Springfield K45	3	1/4	1 1/2	1/16	21	2 1/8	1/16	4	21	2 1/8	1/16	4	145	38
Kelly-Springfield K50	3	1/4	1 1/2	1/16	21	2 1/8	1/16	4	21	2 1/8	1/16	4	145	83
Kelly-Springfield K60	3	1/4	1 1/2	1/16	21	2 1/8	1/16	4	33	3 1/4	1/16	4	135	34
Kimball	.....	.....	1 1/4	.....	50	2 1/4	1/4	4	.....	.....	.....	.....	.....	.....

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Kimball	...	...	1¼	...	52	2½	¼	4	33	3½	¼	...	152	34
Kimball	...	...	1½	...	52	2½	¼	4	33	3½	¼	...	152	34
Kimball	...	...	1½	...	58	3	¼	2	58	3	¼	...	171	36
Kimball	...	...	1½	...	65	3	¼	2	65	3	¼	...	171	36
King-Zeitler 1½	3	1/16	1	1¼	48	3¼	¼	4	48	3¼	¼	4	Opt	32
King-Zeitler 2	3	1/16	1	1¼	54	3½	¼	4	54	3½	¼	4	Opt	32
King-Zeitler 3½	3	1/16	1	1¼	63	3¾	¼	4	63	3¾	¼	4	Opt	36
Kissel-Utility	3	1/16	.....	1¼	19	2	1/16	2	19	2	1/16	2	120	34
Kissel-Freighter	3	1/16	.....	1¼	13½	3½	¼	2	13½	3½	¼	2	144	34
Kissel-Heavy-Duty	3	1/16	.....	1¼	56	2½	1/16	2	56	2½	1/16	2	156	36
Kissel-Goliath	3	1/16	.....	1¼	56	2½	1/16	2	56	2½	1/16	2	168	36
Kissel-Delivery	3	1/16	.....	1¼	44¼	2	1/16	2	44¼	2	1/16	2	96	33½
Kleiber 1	...	...	1¼	1¾	...	...	...	...	...	...	...	...	120	34
Kleiber 1½	...	...	1¼	1¾	...	...	...	...	...	...	...	...	132	34
Kleiber 2	...	...	1¼	1¾	...	...	...	...	...	...	...	...	144	34
Kleiber 2½	...	...	1¼	1¾	...	...	...	...	...	...	...	...	150	34
Kleiber 3½	...	...	1¼	1¾	...	...	...	...	...	...	...	...	156	34
Kleiber 5	...	...	1½	1¾	...	...	...	...	...	...	...	...	168	38
Knox 35	4	¼	1½	...	...	4	...	2	57¾	6½	¼	1	27 1/16	28
Knox 36	4	¼	1½	...	...	4	...	3	57¾	6½	¼	1	96 1/8	28
Koehler M	4	¼	1¼	1/16	13½	3½	¼	4	13½	3½	¼	4	144	34
Koehler C	3	1/16	1	¼	47	2¼	1/16	2	46	2¼	1/16	2	108	34
Lange	3	...	...	...	30	2	¼	2	18	3	¼	4	114	37
Larrabee-Deyo U	3	1/16	1¼	...	48	2	¼	2	48	2	¼	2	108	34
Larrabee-Deyo A & B	3	1/16	1¼	...	60	2½	¼	2	60	2½	¼	2	132	36
Larrabee-Deyo C & D	3	1/16	1¼	...	54	2¼	¼	2	54	2¼	¼	2	132	36
Larrabee-Deyo T	3	1/16	1¼	...	72	3	¼	2	72	3	¼	2	162	36
Lombard	...	...	...	...	...	...	...	...	...	...	...	...	120	32
Luedinghaus	...	...	1¼	1 11/16	40	2¼	¼	2	40	1½	¼	2	120	34
Luverne BBL	3	1/16	1¼	1¼	...	2½	¼	2	...	2½	¼	2	108	34
Maccar L	3	1/16	1¼	3/8	48	3¼	¼	4	48	3½	¼	4	128¼	34
Maccar H	3	1/16	1¼	3/8	52	3½	¼	4	52	3½	¼	4	143¾	34
Maccar M	3	1/16	1¼	5/8	64	3¾	¼	4	64	3¾	¼	4	157¾	34
Maccar G	3	¼	1½	3/8	72	4	¼	4	72	4	¼	4	166 5/8	37½
Mack AB	3	...	1¼	¼	14¼	4	¼	2	16½	2½	¼	4	120	33¼
Mack AB-Worm	...	...	1¼	¼	13½	3½	¼	4	13½	3½	¼	4	144	33¼
Mack AB-2 Ton	3	...	1¼	¼	14¼	4	¼	2	16½	2½	¼	4	120	33¼
Mack AB-Tractor	3	...	1¼	¼	14¼	4	¼	2	16½	2½	¼	4	77	33¼
Mack AC	2	...	1¼	¼	16⅛	3	¼	4	20½	3½	¼	4	132	37½
Mack AC 7-Ton	2	...	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	87	37½
Mack AC 5½-Ton	...	...	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	156	37½
Mack AC 7½-Ton	...	...	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	156	37½
Mack AC 11-Ton	2	...	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	87	37½
Mack AC 15-Ton	2	...	1½	¼	16⅛	3	¼	4	20½	3½	¼	4	87	37½
Master JI	3	1/16	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Master JW	3	1/16	1¼	2	12	3¼	¼	2	12	3¼	¼	2	120	34
Master M	3	1/16	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Master O	3	1/16	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	159	34
Master W	3	1/16	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	120	34
Master WL	3	1/16	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	159	34
Master T	3	1/16	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	74¾	34
Master A	4	1/16	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	150	36¾
Master AL	4	1/16	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	186	36¾
Master B	4	1/16	1½	1¾	18	4	¼	2	18	4	¼	2	168	39
Master BL	4	1/16	1½	1¾	18	4	¼	2	18	4	¼	2	192	39
Maxwell 1½	3	1/16	1	1	16	1¾	1/16	2	16	1¾	1/16	2	102	36 1/16
Menominee HT	3	1/16	1	1½	12	3¼	¼	8	...	...	...	...	.....	32
Menominee H	3	1/16	1¼	1¾	13½	3½	¼	8	...	...	...	...	.....	32
Menominee D	3	1/16	1¼	1¾	13½	3½	¼	8	...	...	...	...	.....	36
Menominee G	3	¼	1½	2	16	3½	¼	8	...	...	...	...	.....	38
Menominee J	3	1/16	1½	2	18½	4	¼	8	...	...	...	...	.....	34
Moreland 19B	3	1/16	1¼	1¾	12	3½	¼	4	12	3½	¼	4	132	34
Moreland 19C	3	1/16	1½	1¾	13½	3½	¼	4	13½	3½	¼	4	156	34
Moreland 19G	3	1/16	1½	1¾	16	3¾	¼	4	16	3¾	¼	4	168	38
Moreland 19J	3	1/16	1½	1¾	18	4	¼	4	18	4	¼	4	168	38
Muskegon 20	3	1/16	2	2	54	2½	1/16	2	53	2¼	1/16	2	119½	34
Myers 60	3	1/16	1½	1½	44	2	2¼	2	44	2	2¼	2	102	34
Myers 80	3	1/16	1½	1½	44	2	2¼	2	44	2	2¼	2	112	34
Napoleon 9	3	¼	1	1/16	44	2	1/16	1	30	2½	1/16	1	102	35
Napoleon 11	3	¼	1	1/16	49	2	1/16	1	30	2½	1/16	1	102	35
Nash 2018	4	¼	1¼	1¼	49 1/8	2	3/16	2	20 7/16	2½	1/16	1	104½	30½
Nash 3018	4	¼	1¼	1¼	50 5/8	3	1/16	2	20 7/16	2½	1/16	1	118½	31⅝
Nash 4017	3	¼	1¼	1¼	49¼	2½	¼	4	25 7/16	2½	¼	1	117⅛	38⅞
Nelson & LeMoon F1	3	1/16	1¼	1/16	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F1½	3	1/16	1¼	1/16	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F2	3	1/16	1¼	1/16	12	3¼	¼	2	12	3¼	¼	2	Opt	.....
Nelson & LeMoon F3½	3	¼	1¼	1/16	16½	3¾	¼	2	16½	3¾	¼	2	Opt	.....
Nelson & LeMoon F5	4	¼	1½	1/16	18	4	¼	2	18	4	¼	2	Opt	.....
Netco D	3	1/16	1¼	...	13	3½	¼	2	13	3½	¼	4	116	34
Netco H	3	1/16	1½	...	13	3½	¼	2	13	3½	¼	4	144	34
Northway B2	...	...	1 1/16	1¾	50½	2¼	¼	2	50½	2¼	¼	2	118	33
Northway B3	...	...	1 1/16	1¾	54	2½	¼	2	54	2½	¼	2	148	34⅝
O. K	3	1/16	1¼	...	43	2½	1/16	1	58	2½	1/16	1	125	35
O. K	3	1/16	1¼	...	43	2½	¾	1	58	2½	1/16	1	125	35
Old Hickory M	3	1/16	1	1	46	2	1/16	1	43	2	1/16	1	90	30
Old Hickory W	3	1/16	1⅜	1	24	2¼	¼	2	24	2¼	¼	2	120	36
Old Reliable A	3	1/16	1	1	48	2	¼	2	54	2	¼	1	105	32
Old Reliable B	3	¼	1¼	1¼	54	2	¼	1	54	2	¼	1	144 5/16	32
Old Reliable C	3	¼	1½	1½	60	2½	¼	1	60	2½	¼	1	150 5/16	32
Old Reliable D	3	¼	1½	1½	72	2½	¼	1	72	2½	¼	1	156 5/16	34
Old Reliable K, L, M	3	¼	1½	1½	54	3½	¼	1	60	4	¼	1	107	36
Oldsmobile T	3	...	1	1/16	42¼	2	1/16	1	41 1/16	2	1/16	1	92 5/8	34
Oneida A	3	1/16	.....	.....	12	3¼	¼	4	.....	.....	.....	...	130	32
Oneida B	3	¼	.....	.....	12½	3½	¼	4	.....	.....	.....	...	130	32
Oneida C	3	1/16	.....	.....	12½	3½	¼	4	.....	.....	.....	...	146	32
Oneida D	3	1/16	.....	.....	15 5/8	3¾	¼	4	.....	.....	.....	...	162	36
Oneida E	3	1/16	.....	.....	18	4	¼	4	.....	.....	.....	...	204	38
Oshkosh A	3	1/16	1¼	2	23 5/8	3	¼	1	43 7/16	2½	1/16	2	108 5/8	34
Oshkosh AA	3	1/16	1¼	2	23 5/8	3	¼	1	43 7/16	2½	1/16	2	143 5/8	34
Packard 1½E	3	¼	1⅝	1¾	7 1/16	4¾	¼	2	14	2	1/16	2	126	31¾
Packard 2E	3	¼	1⅝	1¾	7 1/16	4¾	¼	2	14	2	1/16	2	132	31¾
Packard 3E	3	¼	1⅝	1¾	9 1/16	4¾	¼	2	17	3	1/16	2	144	39
Packard 4E	3	¼	1⅝	1¾	9 1/16	4¾	¼	2	18¾	3	1/16	2	144	39
Packard 5E	3	¼	1⅝	1¾	9 1/16	6½	¼	2	18¾	3½	1/16	2	144	39
Packard 6E	3	¼	1⅝	1¾	9 1/16	6½	¼	2	18¾	3½	1/16	2	144	39
Paige 50-18	3	1/16	.....	.....	13¼	3½	¼	4	13¼	3½	¼	4	126	33
Paige 51-18	3	1/16	.....	.....	13¼	3¾	¼	4	13¼	3¾	¼	4	144	35
Parker F9	3	1/16	.....	.....	13¼	3¾	¼	4	13¼	3¾	¼	4	127	33
Parker J9	3	¼	1¼	.....	10¾	5	¼	2	17	2¼	¼	4	139½	33
Parker M9	3	...	1¼	.....	10¾	5	¼	2	17½	3½	¼	4	145	37
Patriot Lincoln	3	¼	1½	.....	10¾	5	¼	2	18	4	¼	8	109	34
Patriot Revere	3	1/16	1 1/16	1 11/16	41	1¾	¼	2	41	1¾	¼	2	92½	33¼
Patriot Washington	...	...	1 1/16	1 11/16	41	1¾	¼	2	41	1¾	¼	2	113¾	34
Pierce-Arrow 5	3	1/16	1 1/16	1 11/16	55	2¼	¼	2	55	2¼	¼	2	149 11/16	34
Pierce-Arrow 2	4	11/16	1½	1¾	7¼	3½	¼	2	18	4	¼	4	98¼	34 1/16
Pittsburgher 2½	4	¼	1 3/8	1¾	8 3/4	5	1/16	2	18 13/16	3	1/16	4	136	33
Pony ¼	3	¼	1¼	1¼	44	2¼	¼	2	44	2¼	¼	2	40	24
Rainier R6	3	1/16	⅞	⅞	...	...	...	...	10	1½	⅛	2	96 1/8	34
Rainier R9	3	1/16	1 1/16	11/16	19	2	1/16	2	19	2	1/16	2	124	34
Rainier R11	3	1/16	1 1/16	11/16	44½	2	¼	1	44½	2	¼	1	87¾	34
Reliance A10	3	¼	1¼	⅜	11¼	3	1/16	2	11¼	3	1/16	2	122	32
Reliance B20	3	¼	1¼	⅜	15	2	1/16	4	15	2	1/16	4	127	32
Reo F	3	1/16	1	1	15	2	1/16	4	15	2	1/16	4	84	30
Republic 10	3	1/16	1	.....	43	2¼	1/16	1	38 11/16	2¼	1/16	2	98½	34
Republic 11X	3	1/16	1	.....	45	2½	1/16	2	43	2¼	1/16	2	118½	34
Republic 19	3	1/16	1¼	.....	54¾	2¼	1/16	2	52½	2¼	1/16	2	120¾	34
Republic 20	3	1/16	1¼	.....	54¾	2¼	1/16	2	52½	2¼	1/16	2	146	37
Riker B	3	¼	.....	.....	56½	3½	1/16	2	31	4½	1/16	4	150	38
Riker BB	5	¼	.....	.....	7¼	4½	1/16	2	20	4	1/16	4	150	38
Rock Falls 1919	5	¼	.....	.....	7¼	4½	1/16	2	20	4	1/16	4	150	38
Rock Falls 1920	3	1/16	1½	.....	43	2	1/16	2	40½	2	1/16	2	87	33
Rowe CW	...	...	1	1/16	...	...	...	...	...	...	...	...	87	33
Rowe CDW2	4	¼	1¼	1/16	19	2	1/16	2	19	2	1/16	8	121½	33
Rowe CDW2½	4	¼	1¼	1/16	45	2	¼	4	45	2	¼	4	123	33
Rowe DEW3½	4	¼	1¼	1/16	51½	2½	¼	4	51½	2½	¼	4	147	33
Rowe FW5	4	¼	1½	1/16	56½	2½	¼	4	56½	2½	¼	4	150	36
Rowe GW3	4	¼	1½	1/16	68	3	1/16	4	68	3	1/16	4	156	38½
Sandow G	3	1/16	1¼	1/16	...	...	...	...	...	...	...	...	144	33
Sandow CG	3	1/16	1	1/16	20	2	1/16	2	20	2	1/16	2	96	34
Sandow L	3	1/16	1	1/16	20	2	1/16	2	20	2	1/16	2	120	34
	3	1/16	1	1/16	60	3	1/16	1	60	3	1/16	1	132	32

Replacement Table—Continued

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Sandow J.	3	1/16	1 1/4	1	13 1/2	3 1/2	1/4	2	16	3 1/2	1/4	2	144	37
Sandow L.	3	1/16	1 1/4	1	18 1/2	4	1/4	2	18 1/2	4	1/4	2	144	37
Sanford 25.	3	1/4	1 1/4	1 1/4	51 1/2	2 1/4	1/16	1	51 1/2	2 1/2	1/16	1	144	35
Sanford 35.	3	1/16	1 1/4	1 1/4	56	2 1/2	1/16	1	56	2 1/2	1/16	1	145	35
Sanford 50.	3	1/16	1 1/4	1 1/4	69	3	1/16	1	69	3	1/16	1	145	35
Schacht 2.	3	1/4	1 1/4	.....	8	3	1/4	2	13 1/2	3	1/4	4	116	35 1/4
Schacht 2 1/2.	3	1/4	1 1/4	.....	8	3	1/4	2	13 1/2	3	1/4	4	140	35 1/4
Schacht 3 1/2.	3	1/4	1 1/4	.....	8	3	1/4	4	13 1/2	3	1/4	4	152	35 1/4
Schacht 5.	3	1/4	1 1/4	.....	8	3	1/4	4	15	4	5/16	4	152	35 1/4
Selden 1 1/2 A.	3	1/16	1	1 1/16	11 11/16	3 1/4	1/16	2	11 11/16	3 1/4	.....	2	114	34
Selden JWBL.	3	1/16	1	1 1/16	13 3/8	3 1/2	1/16	2	13 3/8	3 1/2	.....	2	144	34
Selden 3 1/2 A.	3	1/16	1 1/4	1 1/16	15 3/4	3 3/4	1/16	2	15 3/4	3 3/4	1/16	2	195	37 1/2
Selden DL.	3	1/16	1 1/4	1 1/16	18	4	1/16	2	.....	4	1/16	2	168	36
Service 220.	3	1/16	1 1/8	1 1/16	12	3 1/4	1/4	2	12	3 1/4	1/4	2	109 1/2	34
Service 31.	3	1/4	1 1/16	1 1/16	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	121 1/16	34
Service 36.	3	1/4	1 1/16	1 1/16	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	121 1/16	34
Service 51.	3	1/4	1 1/16	1 1/16	13 1/2	3 1/2	1/4	2	3 1/2	3 1/2	1/4	2	131 1/8	34
Service 71.	3	1/4	1 1/16	1 1/16	16	3 3/4	1/4	2	16	3 3/4	1/4	2	150 1/4	38
Service 76.	3	1/4	1 1/16	1 1/16	16	3 3/4	1/4	2	16	3 3/4	1/4	2	145 3/4	38
Service 101.	3	1/4	1 1/16	1 1/16	18 1/2	4	1/4	2	18 1/2	4	1/4	2	145 3/4	38
Signal F.	3	1/16	1 1/16	1 1/16	12	3 1/4	1/4	2	12	3 1/4	1/4	2	211	34
Signal H.	3	1/16	1 1/16	1 1/16	12	3 1/4	1/4	2	12	3 1/4	1/4	2	211	34
Signal J.	3	1/16	1 1/16	1 1/16	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	220	34
Signal M.	3	1/16	1 1/16	1 1/16	16	3 1/2	1/4	2	16	3 1/2	1/4	2	268	38
Signal R.	3	1/4	1 1/8	1 1/8	18	4	1/4	2	18	4	1/4	2	280	38
Stoughton B.	...	...	...	...	...	...	...	...	...	...	...	...	124	.....
Stoughton D.	...	...	...	...	...	...	...	...	...	...	...	...	124	.....
Stoughton E.	...	...	...	...	...	...	...	...	...	...	...	...	136	.....
Standard 56.	3	1/16	1	1/16	10 7/16	3	1/4	4	10 7/8	3	1/4	4	120	32
Standard 76.	3	1/16	1 1/8	1/16	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	122 1/2	32
Standard 66S.	3	1/16	1 1/4	1/16	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	120	38
Standard 86.	3	1/16	1 1/4	1/16	17 11/16	4	1/4	4	17 11/16	4	1/4	4	120	38
Sterling 1 1/2.	3	1/4	1 1/4	1/4	11 5/8	3 1/4	1/4	8	11 5/8	3 1/4	1/4	8	120	33 1/2
Sterling 2 1/2.	3	1/4	1 1/4	1/4	13 3/8	3 1/2	1/4	8	13 3/8	3 1/2	1/4	8	138	34
Sterling 3 1/2.	3	1/4	1 1/4	1/4	15 1/2	3 3/4	1/4	8	15 1/2	3 3/4	1/4	8	144	38
Sterling 5-Worm.	3	1/4	1 1/4	1/4	18	4	1/4	8	18	4	1/4	8	158	38
Sterling 5-Chain.	3	1/4	1 1/4	1/4	56 1/2	3 1/2	1/4	2	28 3/4	4	1/4	1	158	38
Sterling 7 1/2.	3	1/4	1 1/4	1/4	56 1/2	3 1/2	1/4	2	28 3/4	4	1/4	1	158	38
Stewart M7.	3	1/16	.....	1 1/4	50 5/8	2	1/16	2	8	5	1/16	2	150 1/2	32
Stewart M8.	3	1/16	.....	1	41 3/8	2	1/16	2	22 3/4	2	1/16	1	99 1/2	32
Stewart M9.	3	1/16	.....	1	48 1/2	2	1/16	2	8	5	1/16	2	119	32
Stewart M10.	3	1/16	.....	1 1/4	60	3	1/16	2	8	5	1/16	2	163 3/4	32
Stewart M11.	3	1/16	.....	1/8	41 3/8	2	1/16	2	22 3/4	2	1/16	1	95	32
Sullivan E.	3	1/4	1 1/16	1 1/16	13	3 1/2	1/4	8	13	3 1/2	1/4	8	106	33 1/2
Sullivan F.	3	1/16	1 1/16	1 1/16	13	3 1/2	1/4	8	13	3 1/2	1/4	8	146	34
Superior D.	...	...	1 1/16	1 1/16	45	2 1/2	1/16	2	44	2 1/4	1/16	2	97 3/4	4 1/2
Superior C.	...	...	1 1/16	1 1/16	54	2 1/2	1/16	2	53 1/2	2 1/2	1/16	2	114	5 3/4
Texan TK39.	3	1/16	1	1 1/4	17 1/2	2 1/4	1/16	4	17 1/2	1 1/2	1/16	4	100	36
Tiffin GW.	3	1/16	1 1/4	1 1/4	46	2	1/4	1	46	2	1/4	1	117	35
Tiffin MW.	3	1/16	1 1/4	1 1/4	52	2 1/4	1/4	1	52	2 1/4	1/4	1	138	32 3/4
Tiffin PW.	3	1/16	1 1/4	1 1/4	58	2 1/2	1/4	1	58	2 1/2	1/4	1	151	35 1/2
Tiffin TW.	3	1/16	1 1/4	1 1/4	58	3	1/4	1	58	2 1/2	1/4	1	156	38 1/2
Tiffin UW.	3	1/16	1 1/4	1 1/4	58	3	1/4	1	58	2 1/2	1/4	1	156	38 1/2
Titan 3 1/2.	3	1/4	.....	.....	...	...	...	...	...	...	...	...	144	.....
Titan 5.	3	1/4	.....	.....	...	...	...	...	...	...	...	...	144	.....
Titan 2 1/2.	3	1/4	.....	.....	...	...	...	...	...	...	...	...	144	.....
Tower J.	3	1/16	1 1/4	1 1/4	...	...	...	...	...	...	...	...	138	32 1/2
Tower H.	...	...	1 1/4	1 1/4	...	...	...	...	...	...	...	...	150	32 1/2
Tower G.	3	1/4	1 1/2	1 1/2	...	...	...	...	...	...	...	...	156	37
Traffic C.	3	1/16	1	1/16	42 1/2	2 1/2	1/16	2	39 1/2	1 3/4	1/16	2	120 3/4	42
Transport 20.	3	1/16	.....	.....	46 1/2	2	1/16	2	47	1 1/2	1/16	2	101	34
Transport 30.	3	1/16	.....	.....	46 1/2	2	1/16	2	47	1 1/2	1/16	2	116 5/16	34
Transport 50.	3	1/16	.....	.....	50	3	1/16	2	48 1/2	2 1/2	1/16	2	123	34
Triangle AA.	3	.....	1	1	23 1/8	2 1/2	1/16	1	41	2	1/16	1	94	34
Triangle A.	3	.....	1	1	3 1/4	4	1/16	2	49	2	1/16	1	126	35
Triangle B.	3	.....	1 1/4	1 1/4	3 1/4	4	1/16	2	52	2	1/16	1	132	35
Triangle C.	3	.....	1	1	3 1/4	4	1/16	2	52	2	1/16	1	128 3/16	35

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Triumph 1 1/2.	...	...	...	...	...	...	...	...	...	...	...	...	120	.....
Twin City A & B.	3	...	2	2	16	3 1/2	1/4	2	48	3 1/2	1/4	2	138	46
Union F.	3	1/4	1 1/4	1	55	3	1/16	1	50	2	1/16	1	144	32
Union H.	3	1/4	1 1/4	1	19	3 1/2	1/16	2	10	4	1/16	1	168	34
U.S.N.	3	1/16	1	1/8	50 1/2	2	1/16	2	46 1/2	1 1/2	1/16	2	120	34
U.S.H.	4	1/16	1 1/4	1/4	46	2 1/4	1/4	2	46	2 1/4	1/4	2	132	36
U.S.J.	3	1/16	1 1/2	1/4	50	2 1/2	1/4	2	50	2 1/2	1/4	2	156	39
U.S.K.	...	1/4	1 1/2	1/4	62	3	1/4	2	62	3	1/4	2	168	39
Velie 46.	3	1/16	1	1/16	54 8/16	2 1/2	5/16	2	52 1/8	2 1/4	5/16	2	120	31
Velie 25B.	3	1/16	1 1/4	1/16	12	3 1/4	1/4	4	12	3 1/4	1/4	4	134 1/2	33
Velie 26B.	3	1/16	1 1/4	1/16	15 5/8	3 3/4	1/16	4	15 5/8	3 3/4	1/16	4	154 1/2	37
Vim 27.	3	1/16	7/8	.....	14 1/2	1 1/2	1/16	4	14 1/2	1 1/2	1/16	4	64	30
Vim 28.	3	1/16	7/8	.....	14 1/2	1 1/2	1/16	4	14 1/2	1 1/2	1/16	4	83 1/2	30
Vim 25.	4	1/16	1	.....	19	2	1/16	4	19	2	1/16	4	92	32
Vim 22.	4	1/16	1	.....	44 1/2	2	1/4	2	44 1/2	2	1/4	2	121 1/4	34
Vim 23.	5	1/16	1 1/4	.....	51 1/2	2 1/4	1/4	2	55 1/2	2 1/4	1/4	2	159 1/2	34
Walker M.	...	...	...	...	43	2 1/4	1/16	2	18	1 3/4	1/16	4	87	32
Walker K.	...	...	...	...	46	2 1/2	1/16	2	18	2	1/16	4	96	32
Walker L.	...	...	...	...	53 1/2	2 1/2	1/16	2	22 1/2	2	1/16	4	120	35
Walker P.	...	...	...	...	53 1/2	3	1/16	2	22 1/2	2 1/2	1/16	4	140	35
Walker N.	...	...	...	...	53 1/2	3	5/16	2	22 1/2	2 1/2	1/16	4	162	35
Walter S.	3	1/4	1 3/4	.....	15	5	1/4	4	57	2 1/2	1/4	2	150	36
Walter T.	...	...	1 1/2	.....	14	4	1/4	4	50	2 1/2	1/4	2	144	33
Ward LaFrance 2B.	3	1/16	.....	1 1/4	13	3 1/2	1/4	4	13	3 1/2	1/4	4	125	33
Ward LaFrance 4A.	3	1/16	.....	1 1/2	26	2 1/2	1/4	4	18	3 1/2	1/4	4	168 1/4	37
Ward LaFrance 5A.	1 1/2	...	...	...	...	...	...	...	...	...	...	...	168 1/4	37
Ward WS.	...	...	...	...	29	1 1/2	1/16	2	15 3/4	1 1/2	1/16	1	72	37 1/2
Ward WA.	...	...	...	...	16	1 3/4	1/16	8	16	1 3/4	1/16	8	95	33 1/16
Ward WB.	...	...	...	...	20	2	1/16	8	20	2	1/16	8	120	33 1/4
Ward WD.	...	...	...	...	48 7/8	2 1/4	1/4	4	48 7/8	2 1/4	1/4	4	144	33 5/8
Ward WF.	...	...	...	...	56 7/8	2 1/2	1/4	4	56 7/8	2 1/2	1/4	4	168	34 5/8
Ward WH.	...	...	...	...	68 3/4	3	1/4	4	68 3/4	3	1/4	4	192	37
Ware 3 1/2 & 1 1/2.	...	...	2 1/2	1 1/2	...	3	1/4	...	42	3	1/4	...	120	36
White 15.	3	...	1 1/4	...	...	...	...	...	...	...	...	...	76 1/2	34
White 20.	3	...	1 1/4	...	...	...	...	...	...	...	...	...	107 1/2	34
White 40.	...	...	1 1/4	...	...	...	...	...	...	...	...	...	157	42
White 45.	...	...	1 1/2	...	...	...	...	...	...	...	...	...	157	42
White Hickory H.	3	1/16	1 1/4	1 1/2	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	116 1/4	32
Wichita L.	3	1/16	1	1 3/8	19	2	1/16	2	19	2	1/16	2	Opt	30
Wichita M.	3	1/4	1	1 3/8	45	2	1/4	2	45	2	1/4	2	Opt	30
Wichita R.	3	1/4	1	1 3/8	51	2 1/4	1/4	2	51	2 1/4	1/4	2	Opt	30
Wichita O.	3	1/4	1 1/4	1 3/4	56	2 1/2	1/4	2	56	2 1/2	1/4	2	Opt	36
Wichita S.	3	1/4	1 1/2	2	60	3	1/4	2	60	3	1/4	2	Opt	36
Wilcox A.	3	1/4	.....	.....	24 1/8	2 1/2	1/16	4	16	2 1/2	1/16	4	96	34
Wilcox B.	3	1/4	.....	.....	24 1/8	2 1/2	1/16	4	16	2 1/2	1/16	4	132	33
Wilcox C.	...	...	...	...	27 1/2	2 1/2	1/16	4	20	2 1/2	1/16	4	141	33
Wilcox D.	...	...	...	...	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	153	33
Wilcox W.	3	1/4	.....	.....	68 1/2	3	1/4	2	68 1/2	3	1/4	2	153	38
Wilson 1.	3	1/16	.....	.....	39 1/2	1 3/4	1/16	1	39 1/2	1 3/4	1/16	1	89 1/2	34
Wilson 2.	3	1/16	.....	.....	13 1/4	3 1/2	1/16	4	13 1/4	3 1/2	1/16	4	126	33
Wilson 3 1/2.	3	1/16	.....	.....	16	3 3/4	1/16	4	16	3 3/4	1/16	4	147	38
Wilson 5.	3	1/16	.....	.....	18	4	1/16	4	18	4	1/16	4	147	38 1/4
Winther 39.	3	1/4	1 1/4	.....	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 430.	3	1/4	1 1/4	.....	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 49.	3	1/4	1 1/4	.....	52	3	1/4	2	50	2 1/4	1/4	2	144	33
Winther 450.	3	1/4	1 1/4	.....	52	3	1/4	2	22 1/2	2 1/4	1/4	1	144	30
Winther 69.	3	1/4	1 1/4	.....	62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 479.	3	1/4	1 1/4	.....	62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 979.	3	1/4	1 1/4	.....	52	3	1/4	2	50	2 1/4	1/4	2	168	33
Winther 89.	3	1/4	1 1/4	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 109.	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 129.	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 149.	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Witt Will 1 1/2.	3	1/16	.....	1 1/4	46	3 1/4	1/4	4	46	3 1/4	1/4	4	102	32
Witt Will 2 1/2.	3	1/16	.....	1 1/4	48	3 1/2	1/4	4	48	3 1/2	1/4	4	122	32
Wolverine C.	...	...	1	1	41 1/2	2 1/2	1/16	2	41 1/2	1 5/8	1/16	2	120	34 3/16

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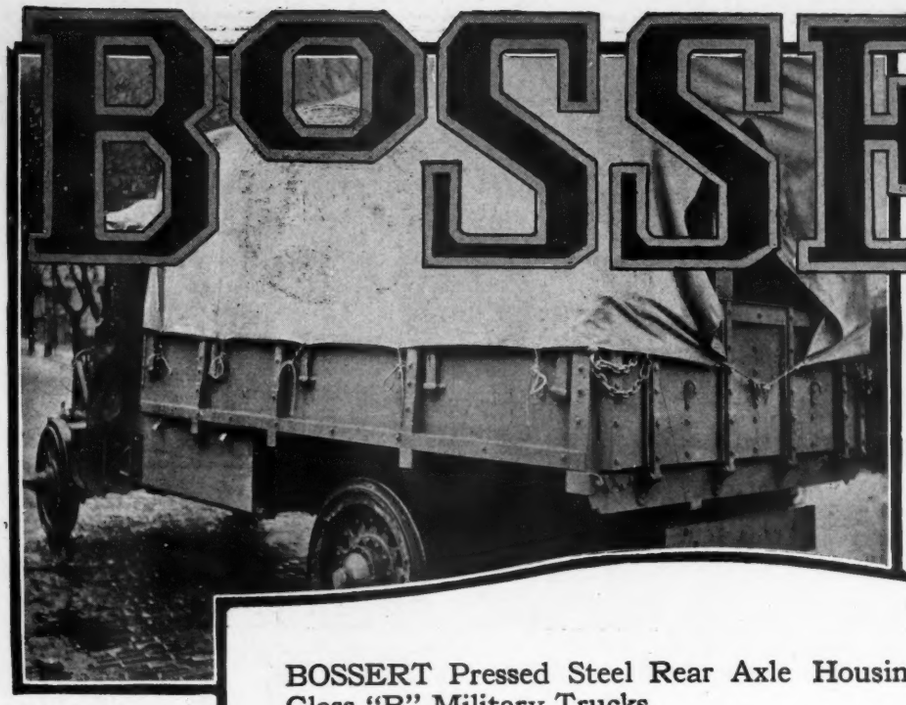
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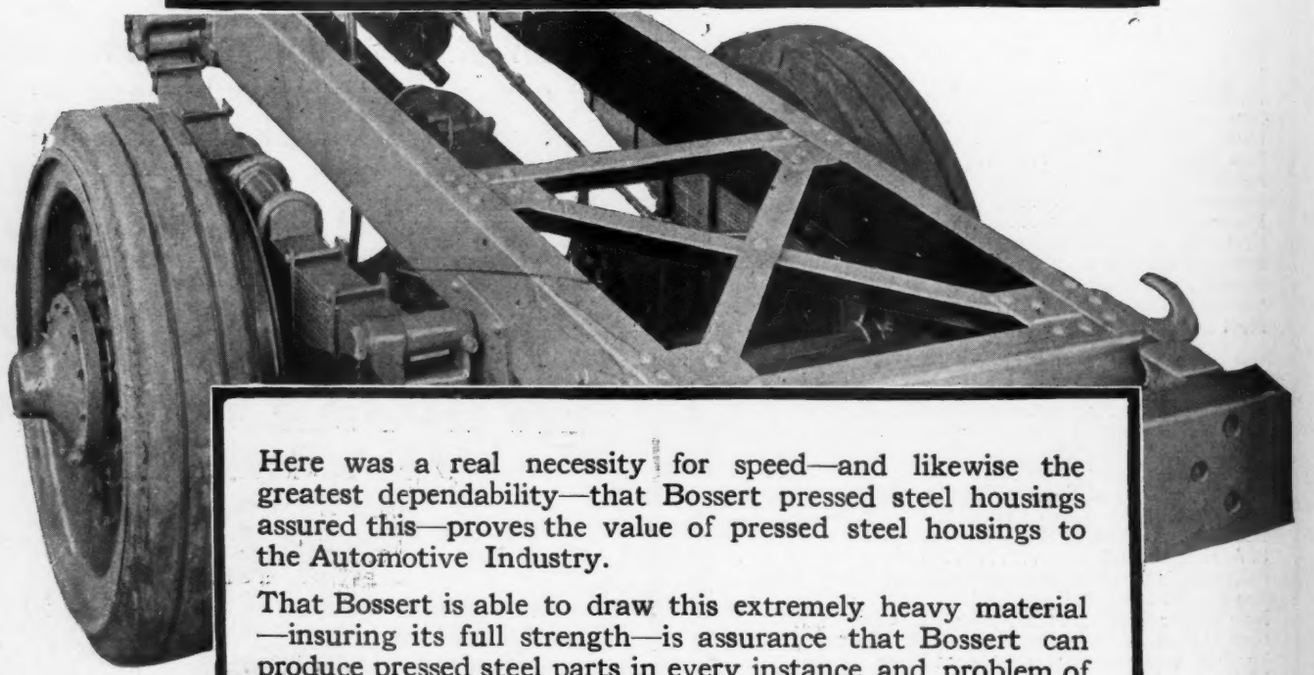
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